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VETERINARY MEDICINE

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Chicago has five leading medical schools, 88 hospitals, is headquarters for the American Medical Association, the American College of Surgeons and has the largest local medical society in the world.

In these days it may be said with justice that it is unscientific to administer any remedy for the eradication of helminth infestation, unless it has been proved by microscopic or other equally sound evidence that helminth infestation actually exists in the animal concerned.

Although one could not by any stretch of imagination point to anthrax, foot-and-mouth disease, or actinomycosis as diseases of the cat, this animal is certainly susceptible to all three affections, and cases have been definitely reported in which one or the other has been detected.—*H. Kirk.*

In a study at the Florida Agricultural Experiment Station, G. E. Ritchey was led to conclude that rabbits could be safely used in determining the palatability of newly introduced hay or pasture plants of which little or nothing is known. It is pointed out, however, that the rabbit must be considered only as indicative of what may be expected, and that the final decision should be based on tests with cattle.

In 1911 tuberculosis was the leading cause of death among the working population. Today it has dropped to seventh place. For the working population, the tuberculosis death rate has fallen from 242 to 56 per hundred thousand in the last 25 years.

This winter, as last, the War Department will vaccinate the men in CCC camps for the prevention of pneumonia, with the vaccine developed at Johns Hopkins University by Dr. Lloyd Felton. The vaccine is prepared at the Army Medical School, Washington, D. C.

Malnutrition is the helpmeet of infection. Of the 10 "horsemen of death," the diseases taking the most American lives annually, seven kill twice as many of the poor as of all other classes. It seems fairly obvious that proper nutrition would reduce the death rate from heart disease, pneumonia, influenza, nephritis, tuberculosis, diarrhea and enteritis.

Biological assay of various portions of the corn plant for their content of vitamin D showed that those portions going into the corn silage which were dried in the field furnished the largest amount of vitamin D; these included tassels, silk, and dried leaves.

Three-colored cats are almost always females; when males, they are sterile.—*G. B. Schnelle.*

Many cats are prone to constipation. When constipated they are stiff-legged and tend to become paralyzed behind.—*G. B. Schnelle.*

The cat almost never is a true friend of man. There seldom is any strong bond of affection between the cat and its master, although there are exceptions.—*J. M. Vernon.*

Changing contagious diseases from scourges which impoverished whole populations and destroyed civil governments into local outbreaks, well controlled, is the gift of the veterinary profession to the welfare of man.—*L. A. Merillat.*

Sheep and goats, according to H. Jacotot (*Comp. Rend. Acad. Sci.*, Paris), may become carriers of hog cholera virus as a result of inoculation or cohabitation with affected swine. Sheep and goats evidence no symptoms, but they may eliminate the cholera virus in excrements.—*Exp. Sta. Rec.*, 77:3.

I do not in the least decry laboratory assistance. I advocate it very strongly and I, myself, resort to it probably more frequently than most people; but the findings must be interpreted in conjunction with the clinical symptoms as discovered by careful observation and examination of the actual patient.—*Geo. H. Wooldridge.*

Undulant fever resulting from *Brucella* infection apparently yields to fouadin. Intramuscular injection of the new antimony preparation in the gluteal region caused a subsidence of the temperature after the second dose. Complete recovery took place in eight weeks. There is no unfavorable reaction; however, the drug does not seem to influence the onset of certain complications or sequelae, such as arthritis.—*E. S. R.* 77:105.

Black cats are more apt to chase their own tails than are white or colored cats.—*G. B. Schnelle.*

The effective handling of hog cholera, like the handling of other diseases, is founded on exact knowledge of the malady itself.—*R. R. Birch.*

Blood sugar is apparently a factor that should be given consideration in the occurrence of cataract in rats, according to P. L. Day, who repeated the experiments of Mitchell and Dodge.—*Exp. Sta. Rec.*, 77:3.

The veterinary schools have neglected to round out the veterinarian's training in the past in so much that milk sanitation has had a relatively unimportant part in the curriculum. It is to be hoped that this will be corrected.—*The Milk Inspector.*

Hippocrates (440 B.C.) describes a clinical picture in which the patients had an unnatural appetite (eating dirt, stones, etc.), associated with severe intestinal disturbances, and developed pallor of the skin, which was very probably hookworm disease. —*Curtis Henderson,* M.D.

Of certain chicks at the Minnesota Agricultural Experiment Station exhibiting congenital tremor, 88% died before one month of age. Matings of carrier males and females produced 408 normal and 39 progeny with tremors. It was shown that the condition might be due to the operation of two recessive factors.

We are rapidly discarding the old belief that any one who can use a hypodermic syringe can cope with hog cholera. Questions constantly arise regarding diagnosis, complications, when or whether to immunize, which method to use, the subsequent care of the herd, the handling of young pigs, slaughtering from infected herds under inspection, and many other individual problems.—*Raymond R. Birch,* in "Hog Cholera, Its Nature and Control."

Cooperation Must Continue

Thirty years ago nearly 200 people out of every 100,000 of our population were dying from tuberculosis. During these years three and one-half million men, women, and children have died from this preventable disease but had the mortality rate prevailed an additional two and one-half million would have died. Today the tuberculosis mortality rate is 55 per 100,000 in this country and there are more than 500,000 people sick with tuberculosis.

The chief concern of the thousands of men and women working with the national, state and local tuberculosis associations is to find tuberculosis in its early stage when cure may be more easily affected. The greatest number of deaths occur between the ages of 15 and 45 for which age group tuberculosis is still the leading cause of death. In spite of the steady improvement of diagnostic methods, only 13% of the cases admitted to sanatoria are found to be in the early stages of the disease. This means there are far too many unrecognized cases in the community infecting their families and neighbors. Only by finding every single case can the disease be stamped out.

Early examination, skillful diagnosis and prompt treatment are the factors which made the disease curable and preventable. Suspicious cases should be promptly examined, and examinations even where the disease is not suspected are important.

All this means that the cooperation given the campaign during these 30 years must be continued. The public has done its share generously in the past and now has another opportunity to continue its interest and help. Tuberculosis is everybody's problem, for tuberculosis undiscovered endangers everyone. Help to bring it under complete control by buying Christmas Seals. Look for the double-barred cross on the seals you buy and use, the symbol of the world-wide fight against man's oldest disease enemy.—*C. L. Newcomb.*

Pathological Heredity

Amateur geneticists tobogganing in the realm of horsemanship have always contended that bad wind, stringhalt and the group of skeletal vegetations notoriously common in the equine species are hereditary. To them pathological processes are passed down to offspring by unsound parents, especially the sires. One hears less about unsound mares, because breeding a mare is the owner's personal affair.

On the other hand, professional geneticists are cautious about proclaiming the transmissability of local afflictions. They know too much about the intricate physiology of reproduction to stub their toes on the unproved theories of horse-show judges, who, needless to repeat, denounce every local pathological condition as a threat to the breed.

An excellent illustrated booklet, by Ellis McFarland, "collaborating with one hundred leading judges and breeders in the United States and Canada," portrays the popular idea about the danger of breeding to unsound stallions. This group of excellent horsemen is cocksure, for example, that sidebones, spavins, curbs, and bad wind are transmissible ailments.

Comes now an article entitled "Some Hereditary Traits in Thoroughbred Pedigrees," by Col. A. C. Todd, veterinary officer of the British Army, published in the May (1937) issue of the *Journal of the Royal Army Veterinary Corps* that beautifully upsets the old ideas, ideas which have lived too long for the good of the horse industry. Colonel Todd traces the breeding history of an endless list of famous thoroughbreds incapacitated by unsoundness (spavins, ringbones, roaring, defective vision, and the like) and succeeds in showing that the damage done to a breed by unsound ancestors has been greatly exaggerated through former ignorance of the actual etiological factors.

Gallant horses in endless file, winners of

great sporting events, are pointed out in support of the contention that local pathological conditions and the architectural makeup of a horse are two things which should be judged entirely apart from one another. No one questions the judges' philosophy of profile. Size, shape, contour of normal structure is one thing; disease is something else, something too recondite for casual adjudication. We think that the advances made in pathology have shown that the provisions of stallion registration laws and the regulations for judges should be revised. It's the old story of the layman's interpretation of disease which has dogged the footsteps of medicine since Aesculapius. —*L. A. Merillat.*

Veterinary History

Early in the use of tuberculin any citizen of the state who applied to the Wisconsin live stock sanitary authority for tuberculin was supplied, and no record kept of its use. In 1910 the distribution of tuberculin was limited to licensed veterinarians, men who had passed an examination given by the state on the use of tuberculin and the owners of cattle. In that year 48,541 animals were tuberculin tested; 23,009 by veterinarians, 20,580 by persons who had passed the state examination, and 4,952 by the owners of the cattle tested. The veterinarians found 6% reactors (11.6% no visible lesion); the lay testers, 3% (22.7% no visible lesion), and the owners, 2.6% reactors with 27% in the no lesion class. This superior showing by the veterinarians was made notwithstanding that 50% of the licensed veterinarians in the state at that time were non-graduates, of whom a large percentage "are grossly incompetent and ignorant of the tuberculin test," according to a statement by the state veterinarian (U. S. L. S. S. A. Ann. Rept. 1910, p. 173).

Rheumatism in Swine

The report on "Nutritional Deficiency in the Boar" in the August issue of VETERINARY MEDICINE was read with interest.

I have seen several cases with nearly identical symptoms and diagnosed them as rheumatism due to exposure. Both sexes and all ages have been affected—once a whole litter of pigs. Invariably the hogs so affected slept in a damp bed, and too the weather was cool and rainy. Occasionally one hind quarter only was affected. As often, it is the shoulders and front legs. There is no swelling, and if the animal is forced to move, it will push along on the chin and squeal as if in pain.

The animals squealed if forced to arise.

For treatment—I have placed these animals in a dry, well-bedded pen, warm if possible. I have seen no fatalities. In three or four days recovery has been complete, and there have been no relapses.

We may have been wrong in our diagnosis, yet our treatment was satisfactory.

L. E. Thompson.

Waxahachie, Tex.

Tetanus Toxoid

Tetanus toxoid, also known as tetanus anatoxin, is a common article of the veterinarian's arsenal, because immunity conferred by tetanus antitoxin is passive and short. According to Hall (*U. S. Naval Medical Bulletin,* October, 1936) from one-half to two-thirds of the tetanus antitoxin injected into an animal disappears in two or three days, and the rest passes from the body before the longest period of incubation has elapsed. So, since the antitoxic titer rises in seven days after an injection of toxoid, it is best to reinforce each dose of antitoxin by administering a dose of toxoid at the same time. When the animal is valuable, and the owner agrees to the additional expense, a second dose of toxoid alone 30 days later is a classical and scientific practice and is claimed by the most capable authorities to give lifelong immunity.

Outstanding practitioners who have followed the developments of this valuable biological prophylaxis practice the simultaneous use of tetanus antitoxin and tetanus toxoid as a routine measure. All should do so, because tetanus toxoid is a new and effective veterinary weapon and has a scientifically-approved background. Not to use it is to omit a saviour of life and property.—*Excerpt from the Corn States Needle.*

Veterinary Service in India

By WALTER BUCHLER,
London, England

THE work of the veterinarian in India differs from the work of veterinarians in western countries. In the large cities as Calcutta and Bombay there are a number engaged in private practice, treating pet animals belonging to wealthy Indians and Europeans. Otherwise all veterinarians in India are in the government employ and their services are available, without charge, to anybody and everybody. In the main the natives do not invite the aid of the government veterinarians although their services are free; preferring the native quacks who use only native herbs for medicine.

The veterinarian in India is largely concerned with infectious diseases of cattle, such as rinderpest and foot-and-mouth disease. In northern India he also treats camels for surra. In the south and eastern parts, elephants provide additional work, such as treating colic, etc. In treating elephants the mahout is indispensable to the veterinarian. Without him restraint would be a difficult and time-consuming task.

Horses are not important in India; the work animals being principally oxen.

India has no lack of dogs, mostly strays. European breeds are imported for pets. They suffer far more from distemper and the other usual diseases than do the native animals. Cats, too, are numberless and, like dogs, the great majority are ownerless.

THE equipment of veterinarians in India is much like that in other countries except that for treating camels much use is made of long, strong ropes and for elephants chains are used. Medicines are administered mostly in bolus form or as drenches.

All manner of veterinary instruments are manufactured in India, but their quality is uniformly poor. Veterinarians engaged in private practice use exclusively imported instruments. Practically all pharmaceutical and biological products used by the government veterinarians, too, are produced in India, those in private practice use to some extent products supplied by importers in Bombay or Calcutta. There is considerable demand for imported articles of world-wide reputation.

PRACTICALLY all towns of 5000 or more population have a resident veterinarian in government employ. Smaller communities must depend upon district veterinarians, also in government employ. With few exceptions the veterinarians are Indians who received their training in India. A few have studied in England, Germany or the United States. There are five veterinary colleges in India. The course extends over a period of four years. The Indians themselves complain much of the inadequacy of the instruction in them. The private practitioners in Bombay, Delhi and Calcutta include both Indians and Europeans. The Maharajahs have recently gone in for dogs and polo ponies and many employ their own veterinaries.

The present Viceroy of India is doing his utmost to improve the breeds of cattle and veterinary practice is becoming more satisfactory than formerly, however, the veterinary profession is as yet held in little esteem by the natives, who are conservative to the nth degree; reposing their faith mainly in their herbal medicines. When modern treatment fails, as of course it does sometimes, the "news" spreads far and wide in no time, losing nothing but accuracy as it travels.

ADJUDGED even by Indian standards, the government veterinarians are poorly paid. They begin at rupees 120 ($45.00) per month. The average is not above rupees 250 ($95.00). However, the executive head of the service receives the princely salary of rupees 3000 per month. In addition to his salary the veterinarian is allowed traveling expenses and quarters. Each has an assistant who compounds his remedies and looks after his work while he is away from his headquarters, usually about 15 days out of the month.

The Whole Blood Agglutination Test for Pullorum Disease

By H. J. STAFSETH,
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East Lansing, Michigan

Before attempting to explain the principles underlying the agglutination test it may be well to define some terms.

1. *Agglutination.*—This term literally translated means pasting together. In serology the word is used to designate a clumping of germs suspended in a liquid.

2. *Antigen.*—An antigen is a substance which, when introduced into the tissues of an animal in such a way as to preclude intestinal digestion, will stimulate these tissues to produce antibodies. The word antigen is also used to designate the known test fluid used in various blood tests. For example, in the agglutination test for pullorum disease the antigen consists of killed pullorum disease germs suspended in physiological salt solution (0.85% NaCl in water).

3. *Antibody.*—The exact nature of antibodies is not known. Antibodies are known and named by what they do when brought in contact with their specific antigens. For the time being they may be defined as substances elaborated by certain animal tissues in response to the stimulus imparted by antigens. If the antigenic stimulus is great enough, antibodies will be thrown off into the blood stream. The presence of sufficient quantities of free antibodies in the blood makes possible the diagnosis of infectious diseases by such tests as the agglutination test.

The Agglutination Principle in Pullorum Disease Diagnosis

When the pullorum disease germ, *Salmonella pullorum,* enters certain tissues in the body of a bird, these tissues will respond to the toxic effects of the germ by producing antibodies. Thus antibody production is a defense reaction. Among the antibodies produced are the so-called agglutinins. When whole blood or blood serum containing a sufficient amount of agglutinins is added to a suspension of pullorum disease germs in physiological salt solution, the germs, instead of remaining in a uniformly cloudy suspension, gather into clumps sufficiently large to be visible to the naked eye. With the gathering of the germs into clumps, there is clearing of the suspension so that, after more or less complete agglutination has taken place, the contents of the test tube look like clear water in which are suspended numerous whitish particles. These particles will settle to the bottom. This clumping is due to a chemical change in the bacterial cells caused by union with specific antibodies, the agglutinins.

The Tube Test

The tube agglutination test has been used for the diagnosis of pullorum disease for about a quarter of a century. Several states will accept no other test. There is no doubt as to its value. However, there are several disadvantages associated with it. Some of the main ones are:

1. The birds must be handled more than once, whereby production may be more or less seriously interfered with.
2. Blood samples must be sent to a laboratory and the test requires at least 48 hours for completion. Therefore, several days must pass before the reactors can be removed, thus prolonging the period during which infection may be spread.
3. The cost of this test is high, due to the nature of the equipment and the number of workers required.
4. Spoiled and cloudy blood samples interfere with the efficiency of this test.
5. The more or less elaborate system of record keeping associated with this test is conducive to errors.
6. In large states where distances are great and laboratories are not readily accessible the employment of this test is practically prohibitive.

The difficulties associated with the tube test induced some research workers in the field of poultry diseases to search for a simpler method of testing.

The Whole Blood Test

The idea of using a rapid or plate agglutination test in the diagnosis of pullorum disease originated from the work at the Michigan Agricultural Experiment Station by Huddleston and Carlson [1] who developed such a test for the diagnosis of Bang's abortion disease.

In August, 1931, the federal Bureau of Animal Industry [2] and the Michigan Agricultural Experiment Station [3] independently announced the invention of a rapid agglu-

tination test that makes possible the use of whole blood instead of blood serum, whereby testing may be done in the field. In this test, glass plates are used instead of test tubes and the antigen is a concentrated suspension of killed, stained pullorum disease germs in physiological salt solution containing either formalin or phenol as a preservative. The test is made by placing a drop of antigen (standard size) on the glass plate by means of a glass dropper, puncturing the wing vein of the bird with a sharp-pointed instrument and with a standard loop or dropper placing one drop of blood into the drop of stained (blue) antigen, stirring and spreading the antigen-blood mixture to an area of the size of a five-cent coin by means of a toothpick or a wire loop and noting the reaction in about one minute. Rocking or rotating the plate slightly will aid in bringing out the reaction. A typical agglutination reaction consists in the formation of blue particles uniformly distributed throughout the bluish red blood-antigen mixture, the liquid between the particles becoming increasingly clearer as the agglutination process advances toward completion. Some improperly prepared antigens may have "dirt" particles in them and, if the testing is done in a dusty place, dust particles may enter the blood-antigen mixture from the air. There should be no reason for mistaking such particles for clumps of bacteria (agglutinate) because of the fact that, unless true agglutination has taken place, there will be no uniform change in the antigen such as that described above. The presence of one or more unevenly scattered particles in the blood antigen mixture without any clearing of the antigen must not be interpreted as the result of agglutination.

Quality of Antigen of Supreme Importance

There is no single factor in the agglutination test of greater importance than the antigen. If the antigen is not properly standardized it may be lacking in sensitivity (agglutinability) and thus fail to detect weak reactors. On the other hand, some antigens are oversensitive and may agglutinate with blood of negative (noninfected) birds. Some lots of antigen have a tendency to become oversensitive on standing. It is obviously impossible to do accurate testing with either hypersensitive or hyposensitive antigens. At Michigan State College, we, therefore, check the antigens against blood of known positive and negative reactors free of charge for any resident of the state who may care to avail himself of such service. For the best results the antigens should be used as soon as possible after being checked and found satisfactory.

Equipment and Technic

Reliable manufacturers will furnish standardized equipment for this test, and the use of such equipment is strongly recommended. In fact, one should observe all the directions given by the manufacturers as to equipment, temperature, light, etc. One should under all circumstances strive to measure as accurately as possible the quantities of blood and antigen required. If this is not done the results may be disappointing. A good indication of accuracy in mixing the proper quantities of blood and antigen is a uniformity in color of the different drops of blood-antigen mixture. If the surface of the plate, when a series of tests is complete, shows a variety of shades of red and blue, it is certain evidence of carelessness in measuring blood and antigen and the results will be unreliable. Too little as well as too much blood added to a given quantity of antigen may give misleading results.

Advantages of the Rapid Test

It is maintained by several authorities that the rapid test is not as accurate as the tube test. This may be so if both tests are compared under the most ideal conditions for each test, although experimental proof to that effect is lacking. It must, of course, be remembered that a great deal more effort has been spent in perfecting the tube test than has been applied to the whole blood test. Granting that the tube test may be superior when made under ideal conditions, it seems that there is much to be said in favor of the rapid test. The following advantages, in my opinion, more than make up for whatever theoretical shortcomings it may possess, so that, in many localities, it will adequately serve the purpose for which it was intended.

1. Only one drop of blood is needed. This means that the birds should suffer little or no harm due to handling and bleeding.
2. Feed does not need to be withheld prior to testing since cloudy reactions do not occur in the whole blood test.
3. There will be no trouble or errors due to spoiled blood samples.
4. Birds need be handled but once.
5. Reactors can be disposed of immediately, thus greatly reducing further spread of infection.
6. Record keeping is simplified, thereby reducing the chances of errors in disposal of tested birds.
7. The cost of performing the test is low.
8. The test is made at home. Thus the owner will have a chance to see what is being done.

There are also other, less important advantages.

Limitations of Blood Tests

No blood test can detect an infected animal immediately after infection has taken place. Antibody production requires time. In this laboratory we have shown that it requires three days, from the time of introduction of live pullorum disease germs directly into the blood of a chicken, for the production of a sufficient amount of agglutinins to make it possible to obtain a faintly visible degree of agglutination. Four days following intravenous injection of live germs the reaction may be quite distinct and in about a week it is generally rather strong. If the germs are introduced by mouth, as is usually the case when the infection spreads naturally in the poultry house, it takes much longer for enough antibodies to be produced to give positive tests. Under such circumstances one cannot expect distinctly positive tests in much less than two or three weeks. For this reason it is not likely that all infected birds will be detected by one test. Should one desire to make an attempt at eradicating the disease from a flock, obviously it is necessary to retest the flock. Retests should be applied at four to six weeks intervals until two successive tests show no reactors. If the purpose of testing is merely to keep the number of infected birds down to what may be considered a fairly safe limit, a single test, applied just before collecting eggs for hatching, may suffice. The efficiency of a blood test is also limited to a certain extent by the fact that the concentration of antibodies in the blood may fluctuate somewhat. Antibody production is a physiological function and such functions are all more or less variable.

Occasionally one may find a reacting hen that lays normally, producing eggs with a high degree of hatchability and whose chicks are healthy and strong. Such hens have either rid themselves of the infection or they carry it in locations having no connection with the reproductive organs.

In spite of these limitations the agglutination test, when properly applied, is of great value in the fight against pullorum disease.

Test Alone Not Enough

Applying the agglutination test without other supplementary sanitary measures may prove very disappointing. Immediate removal of reactors, cleaning and disinfection of laying houses, incubators, incubator rooms, brooder houses and equipment in general must be practiced to the very best of one's ability. It is especially important to keep droppings out of the feed and water. Chicks should be inspected carefully for symptoms of disease before shipment, immediately upon arrival and daily thereafter for at least one week. If chicks showing pasted vents, diarrhea, watery eyes, tendency to crowd, bulging abdomen, pain in attempting to pass droppings, as evidenced by "crying" are removed promptly, much can be done to keep pullorum disease in check.

Such practices as feeding raw eggs to chicks and hatching eggs from untested stock with those of tested stock often nullify the beneficial effects that may be derived from bloodtesting.

Results Obtained with the Whole Blood Test

The whole blood test has been used exclusively on the flock of the Michigan State College since 1931, and chick mortality due to pullorum disease has been practically eliminated. For several seasons we have failed to isolate pullorum bacilli from chicks sent to us from this flock for examination. These results have convinced us of the value of this test. Hatcherymen in Michigan are also well pleased with the results obtained so far. No other test is used in this state. A testing school is held during September

each year for those who wish to become familiar with the principles and technique of the test.

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3. Coburn, D. R. and H. J. Stafseth. 1931. A Field Test for Pullorum Disease. *Jour. Am. Vet. Med. Assoc.* Vol. 32, No. 2, August, 1931, p. 241.

Arecoline in the Diagnosis of Whipworm Infestation

Four years ago, I discovered accidentally that arecoline hydrobromide is of great assistance in the diagnosis of whipworm infestation in dogs. At that time, I happened to use arecoline to treat three dogs which were suspected of parasitism; but in which fecal examinations had been negative. The arecoline was given to determine whether there were any tapeworms present. In those three cases we found no tapeworms, but subsequent fecal examinations made of the evacuations brought about by the arecoline, all contained a heavy concentration of whipworm eggs.

Since that time, I have handled many cases which were negative to whipworm on the first fecal examination; but positive on the second examination following a dose of arecoline. On many occasions, furthermore, when we were led to believe that we had cured a case of whipworm infestation because of one or two negative fecal examinations, a dose of arecoline would give us a positive fecal examination, and we would have to begin all over again.

We now make it a routine procedure to check all whipworm infestation cases in this way before discharging them as cured. We also use this method as a routine procedure in all cases with unknown history which are brought in for a physical examination and general check up.

My theory is that the stimulation of the arecoline causes the cecum to empty itself, so that if there are any whipworms in the cecum, we are sure to find ova in the stool. It seems quite probable that under normal conditions, the cecal contents get into the feces only occasionally. If this is so, it would account for the fact that normal evacuations often are free of ova in animals infested with whipworms.

Peekskill, N. Y. JOHN M. COFFIN.

Summer Interneship

When Doctor Barsky, a practicing veterinarian in the Adirondack mountain region, invited me to assist him during the summer, I accepted at once. My first morning I had just turned to a more comfortable position, when the doctor called, "Charlie, get up; we have a call." I jumped out of bed and dressed; I was anxious to start my internship.

It was 6:00 A.M. On the way, I was told Bill Gonovitch had a case of dystocia in a cow. The cow certainly looked bad when we arrived. The doctor washed his arms and made an examination. It was not a minute before he told me that it was a posterior presentation, with fetus on its back. The calf was turned, and a chain, cleaned antiseptically, fastened to the hind legs. As the cow strained, we pulled, and as she relaxed, we relaxed. After about half an hour we had delivered the calf. It was large and must have been dead two or three hours before our arrival. Doctor B. removed all the loose pieces of the placenta and inserted two capsules of acriflavine as far into the uterus as possible. Most of the afterbirth was allowed to remain for 42 to 72 hours, when the cow usually has expelled it herself. In 10 minutes after the calf was delivered, the cow got up and started eating. An uneventful recovery followed.

Such was the first of my experiences at Tupper Lake. We were busy all through the summer. The doctor had a general practice, including both large and small animals, and I obtained a great deal of information and experience.

During the first few days, the kennels were full. One dog that was always scratching its ear, was diagnosed as having otorrhea. The ear was cleaned with alcohol, fol-

lowed by tincture of metaphen, and sent home with a can of antiseptic powder, with directions that it be applied frequently.

The majority of dogs treated were cases of eczema. A large springer spaniel (I remember how large he was, because I always had to pick him up and put him on the examination table), had eczema on his nose and tail. We applied moist lotion to the areas and after a scab had formed, pink ointment. In addition, we gave triple arsenate tablets. This animal, one of the most severe cases of eczema we had, recovered in two or three weeks.

Another dog was brought in with porcupine quills in various parts of the body. The quills were removed with tweezers, and the wounds coated with metaphen.

In a general practice one sees cases he would never see in school. A case of tetanus came to our attention. There was little we could do. The owner had called too late, and as the animal was very old, and he thought it not worth the cost of antitoxin, it was shot.

In the time that we didn't have to go out on calls, I learned how to take temperatures and pulse. My preceptor required me to memorize the ranges in temperature of the various domestic animals and to acquire facility in giving pills and liquids.

In addition to being district veterinarian, Doctor Barsky was also milk and meat inspector, and he taught me what to look for in ante-mortem and post-mortem inspection of meat.

Milk brought into the dairies was required to be from tuberculin and mastitis tested herds. To me the mastitis test was the most interesting. We used physical examination and the brom-thymol test. When one becomes adept in handling the udders, the physical examination is very sure.

All this is "old stuff" to experienced veterinarians, but to a student such as I, it was valuable experience. Each day I recorded everything we did in the clinic and the field.

My summer's experience makes my conviction that each student should serve an internship before graduating stronger than ever. As it is, after he has a knowledge of organs and tissues and their functions, the student is sent out into the world. No wonder he still thinks in terms of organs and tissues, medicines and operations, instead of in terms of animal and owner. This could be avoided by requiring each student to serve an internship with some accredited veterinarian. There he would see the animal as a whole, stop thinking in terms of tissues and organs, and so, as they say, not miss the forest for the trees.

Next summer I hope to do still more work in the field. This time, however, I shall want to assist some veterinarian in city practice, not because I prefer the city, but to gain new ideas and experiences that cannot be acquired in a general practice.

CHARLES WEINBERG,
East Lansing, Mich. M.S.C. '39

Osteogenic Sarcoma a Result of Injury

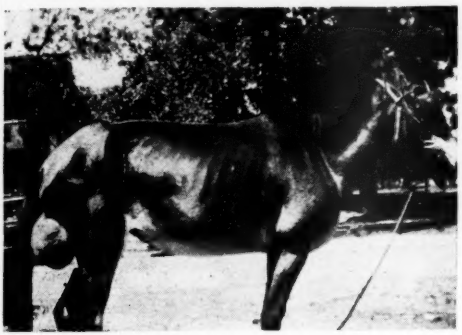
A 16-year-old bay mare mule weighing approximately 1000 pounds was presented for treatment at the Geneva Veterinary Hospital, Geneva, Ind., July 30, 1937. On the right hind leg was a pedunculated neoplasm of such size that it caused difficulty in arising and made running impossible.

The neoplasm, about the size of a volley ball, was largely subcutaneous and was located partly between the semimembranosus and semitendinosus muscles. Circulation was supplied by large blood vessels, mainly of cutaneous origin. Numerous large, superficial veins drained the tumor, especially in the ventromedial aspect. The blood supply of the deeper portions was slight.

The mule had been kicked in this region when a two-year-old. The tumor, which had developed quickly, remained about the size of a walnut for five years. During this time the animal showed no noticeable pain, discomfort or loss of condition. A two-year period of slow growth was next noted during which the neoplasm attained the size of a goose egg, then remained dormant for a year, followed by a second period of proliferation accompanied by discomfort and loss of condition. The rate of enlargement increased until the surgical measures here described were undertaken.

One and one-half ounces of chloral hydrate dissolved in one gallon of water was given orally via the stomach tube. Procaine hydrochloride solution, 1%, was infiltrated subcutaneously circumscribing the surgical area. The hair around the affected part was clipped and shaved and the skin cleansed with a soap base antiseptic solution and then with alcoholic sublimate, 1:250. The large veins visible on the surface were ligated with linen suture.

The skin over the affected area was in-



cised, leaving flaps large enough to cover the site after the removal of the neoplasm. The neoplasm was then dissected out, following the skin as closely as possible at first and later the surrounding muscles. During this time blood vessels were ligated as encountered. Bleeding was profuse.

The cavity was tamponaded with gauze wrapped cotton, saturated with a soap base antiseptic (fortogen). The edges of the skin were brought into apposition over the tampon with linen, interrupted sutures.

Thirty-six hours later the tampon was removed. There was no hemorrhage at this time.

The postoperative treatment was that of an open wound.

The weight of the neoplasm after ablation was fourteen pounds. Macroscopically it had the appearance of fibrous tissue containing large numbers of varying-sized cavities filled with coagulated blood. A grittyness due to bony spicules was noticeable upon incision. Laboratory examination revealed it to be an osteogenic sarcoma.

The cavity filled in rapidly, but two weeks after the operation an abscess developed, which readily healed when drainage was established.

At present, four months after the operation, there is no indication of further growth nor lameness and the animal is gaining in weight and in vitality.

H. B. CAMPBELL, K. S. C., '38.
Manhattan, Kan.

The Passing of a Great Veterinarian

O. Charnock Bradley, M.D., D.Sc., Ch. B., F.R.S.E., F.R.C.V.S., Principal of the Royal (Dick) Veterinary College since 1911, died Nov. 21, 1937, at the age of 66. He had been engaged in veterinary education since 1892—45 years. He served nine years as president of the national veterinary association of Britain and many years on the Council of the Royal College of Veterinary Surgeons, of which he was president two years. His activity in veterinary organizations was not exceeded by anyone of his time. Works from his pen, "The Topographical Anatomy of the Horse" and "The Topographical Anatomy of the Dog" are much used in this country.

Under the above head *The Veterinary Record* of November 27th said editorially:

English-speaking veterinary surgeons all over the world have recognized in Dr. Bradley a leader to whom they could look with pride not only as a veterinarian and anatomist, but as a true educationist and a man of profound culture. To listen to Dr. Bradley, either in class or during an address or an after dinner speech, was a joy which the profession loved, for in these speeches allusions to the classics, to historical facts and to other sciences and learning were frequent and intimate. They reflected a mind grown up in the best tradition of learning and one which could safely rank itself with the leaders of other professions. . . .

Not only was Bradley a leader in the sense that he was principal of a veterinary college, but he was a man who actually led the profession in many other ways. He played a great and acknowledged part in developing veterinary education, but he played an equally important part in organizing the profession generally and insuring that the National Association which resulted from that organization should continuously strive to improve the efficiency of the profession besides jealously guarding its traditions and friendliness.

Periodic Ophthalmia a Result of Inherited and Environmental Factors

We speak of a hereditary disease or defect when one or more definite hereditary factors (genes) are found to be the specific cause of the disease.[2] When one or more of these genes is present, we know there is a definite succession of hereditary factors. Special environmental influences are not necessary for the occurrence of a truly heritable disease; neither need a hereditary disease be congenital. The time of its manifestation is definitely fixed genetically in most instances; usually it is connected with a certain period of life. But there are always specific genetic factors which produce the inherited disease independent of any environmental influence.

Differing from hereditary diseases are those in which we speak of an inherited disposition, or a predisposition. These terms mean that hereditary influences play an important rôle in the development of the disease, but the inherited disposition alone is not sufficient to account for the occurrence of the disease; certain environmental factors, the realization factors, have to be present if the disease is to develop.

The so-called infection theory of periodic ophthalmia, in vogue at the time of bacterial discoveries, has been abandoned today as untenable. The older authorities believed in the heredity of periodic ophthalmia; other writers spoke of an inherited, or acquired tendency to develop this disease.

It has been known for some time that periodic ophthalmia occurs regularly in certain districts and locations; its occurrence is enzootic, especially in districts having a heavy clay and loam subsoil, or soils impervious to water; regions possessing a high groundwater level, or being frequently inundated, are also favored by enzootics. Whenever such soils are drained the incidence of periodic ophthalmia lessens. This happened, for instance, following the correction of the river Elbe, when the pastures and meadows in the vicinity of Graditz were made dry. According to Schwerdtfeger, it is not the water as such which is the primary cause of periodic ophthalmia, but the parasitic invasion on marshy soils which leads to periodic ophthalmia. Schorr, however, states that draining and cultivation of soils does not always result in a lessening of the incidence of periodic ophthalmia.

From the post-mortem examination of horses with periodic ophthalmia, Gmelin reasons that the specific lesions in this disease are merely changes in the reticuloendothelial cells and in the active mesenchyme of the vessels. The changes in the reticuloendothelial cells and in the mesenchyme of the vessels are caused by inundation with toxic proteins. These protein toxins originated probably from intestinal parasites, especially ascarids and strongylids. Normally, foreign protein is taken up by the reticuloendothelial system and by the active mesenchyme, which tissues utilize, dissolve, and dispose of it by means of migratory elements. According to Gmelin, this process takes place while the body is in an allergic state. If then a repeated inundation with foreign protein takes place, the reticuloendothelial system cannot dispose of it quickly enough, and the body enters a state of hyperergasia; that is, the body is highly sensitized against the foreign body. If the inundations do not soon cease, the vessels will be unable to detoxicate the proteins, and an abnormal reaction, known as anaphylactic shock, will occur. In the eye, fibrinous, purulent exudations, accompanied by cellular infiltration, occur; these processes extend to the root and the free end of the iris, causing their glueing together with the cornea or the lense (anterior and posterior synechia). The clinical course of periodic ophthalmia and autopsy findings not only in the eye, but also in the liver, spleen, kidneys, and above all in the mesenchyma of the vessels, are in close

[2] Schäper, W. 1937. **Entstehung und Bekämpfung der Mondblindheit im Lichte der Konstitutionsforschung.** (Etiology and control of periodic ophthalmia from the point of view of genetics.) *Tierärztl. Rundschau* 43:283-288.

agreement with the picture of an allergic disease.

It is known that an inherited disposition towards allergies exists. Inherited disposition alone is not sufficient to cause an allergic disease. Presupposition for its occurrence is always the individually acquired sensibilization which, when the antigen becomes absorbed, manifests itself as disease. The process of inheritance of an allergical disposition consists of a simple, dominant factor.

The rheumatic uveitis of man has much in common with equine periodic ophthalmia. The old designation of rheumatic ophthalmitis for periodic ophthalmia is an exceedingly apt term, and must be considered the most fitting one.

If periodic ophthalmia is an allergic disease, then, reasoning along the lines of genetic pathology, we must conclude that in horses a genotype factor must be responsible for the occurrence of periodic ophthalmia allergy. The repeated occurrence of this disease in certain families is a well-known fact.

The assumption of periodic ophthalmia as an allergic disease presupposes also a special reactive power (allergy disposition) of the body as the factor for the development of the disease.

This reactive power is fixed genetically, and therefore connected with certain families and blood lines. The occurrence of periodic ophthalmia may be feared only in such animals as possess a hereditary predisposition. This makes the repeated occurrence of the disease within certain blood lines, as has been observed, plausible. Of course, the disease develops only then when special environmental influences complicate the inherited predisposition. Environmental damage may be readily traced to intestinal helminths, according to experiments and observations. Especially, the repeated invasions with ascarids and strongylids, respectively, and their toxic products of metabolism, must be considered as factors productive to allergy.

Thus, periodic ophthalmia can occur only when horses possessing a predisposition toward it are forced to live under environmental conditions which facilitate the occurrence of the disease, as the result of invasion of allergy-producing parasites.

It is, therefore, entirely possible that a horse does not succumb to the disease, in spite of a genetic predisposition, if the exposure to environmental, allergy-producing factors is not repeated. On the other hand, the presence of harmful environmental factors will produce periodic ophthalmia only in such animals as are predisposed genetically.

In wet, swampy districts known for the saturation of their soils with eggs and larvae of parasitic worms, the possibility of parasitic invasion is alike for all horses, yet, only a small percentage, perhaps not a single horse, succumbs to periodic ophthalmia.

It is evident that periodic ophthalmia is not a true hereditary disease, but a typical constitutional disease; by its nature it must be considered as an allergic disease, resulting from the reaction of a certain genetic disposition toward definite environmental influences.

Control of Periodic Ophthalmia

It seems plausible that amelioration of the soil and vermifuge treatment must give favorable results in the prevention of periodic ophthalmia. In all probability, the parasites, spread by the wet and swampy pastures, are the most important factors producing a periodic ophthalmia allergy. Without repeated invasion of parasites, a hypersensibility and consequently true periodic ophthalmia attack of the organism cannot take place.

Whenever it is possible to protect horses from the sensitizing action of parasites, one does not need to pay any attention to the possible existence of a genetic disposition toward this form of allergic disease. By preventive measures, such as the correction of the water level of meadows and pastures, collection of manure in stables and pastures, and the deep packing of it in manure piles to destroy the worm eggs and larvae, by supplying clean drinking water, by protective fencing of watering places to prevent contamination, and, finally,

by vermifuge treatment, the disease can be prevented effectively.

Periodic ophthalmia forms a classic example of the successful control of a typical constitutional disease by breaking the connecting link between the hereditarily predisposed organism and the disease producing environmental factors.

In those cases, however, in which it is impossible to eliminate environmental influences, the gradual disappearance of periodic ophthalmia can be brought about by excluding genetically predisposed families and blood lines from breeding. This procedure offers some difficulties, for it is not easy to tell whether a horse with normal eyes has been spared from periodic ophthalmia because of lack of predisposition, or because of lack of potentiality of parasite invasion and consequent hypersensitation.

Besides helminth parasites there may possibly exist other factors capable of causing a periodic ophthalmia allergy. Attention may be called to a relapsing ophthalmitis of a sexual character among mares in heat, and to the so-called harvest conjunctivitis and keratitis of a seasonal character, diseases which are difficult to differentiate from periodic ophthalmia, and which probably also are of an allergic nature. For this reason, investigations into the relationship of hereditary disposition toward periodic ophthalmia encounter great obstacles.

Vitamin C and Arthritis

Rinehart and Mettier (*Jour. Pathol.*, 10, 1034) report that they have produced conditions in guinea pigs very similar to the human arthritis by superimposing an infection on a chronic deficiency in vitamin C. That is, an infection persists indefinitely in chronic scurvy. It may be that this slightly scorbutic, long-continued state is the uric acid diathesis or arthritic tendency of the older writers. That the condition is inherited and runs in families may be due simply to the fact that the absorption of the vitamin is not so good in these strains, or there is a greater destruction or excretion of the vitamin.—*Vitamin Products Company.*

Kelser to be Next Army Veterinary Chief

It will be noted in army veterinary activities, recorded elsewhere in this issue, that Lt. Col. Raymond A. Kelser has been ordered from the Panama Canal Zone to the Surgeon General's Office in Washington. Presumably this means that Col. Kelser will be the next head of the Veterinary Division of the Army, succeeding Col. Foster, whose 4-year tour of duty in the Surgeon General's Office will terminate next May. The selection of Col. Kelser for this responsible position is evidence of the great confidence the Surgeon General reposes in his ability since six veterinary officers senior to him were passed over in making it.

Col. R. A. Kelser

Excepting only Col. Foster, president of the A. V. M. A. 1936-37, no other army veterinary officer is so well known to the veterinary profession in civil life as is Col. Kelser. His contributions to veterinary literature have been many and important and his attendance at A. V. M. A. meetings regular, when he was stationed in continental United States. In the army his most conspicuous achievements have been in the field of veterinary research. Among his outstanding achievements in this field is an improvement of anti-rabies vaccine, determining that the mosquito is a carrier of equine encephalomyelitis and the development of a practical vaccine for the prevention of rinderpest. Since going to the Canal Zone two years ago, Col. Kelser has devoted part of his time to an investigation of skeletal disease in the horse.

Cats are part of the life of many military posts, because of their rodent hunting ability. For the same reason, they are befriended and encouraged to make their homes in storage warehouses and around dockyards. As a pet many cats have performed the meritorious service of warning their masters of fire.—*J. M. Vernon.*

U. S. Live Stock Sanitary Association

The 41st annual meeting of the United States Live Stock Sanitary Association was held in Chicago December 1st, 2nd and 3rd. In the opinion of the writer, who has attended 28 of the last 29 meetings of this association, it has never held a meeting of more value to the livestock industry of the country. Many of the papers and discussions, dealing as they did with regulatory matters, hold their chief interest for those engaged in that line of work. So far as our space will permit, in the following we give abstracts of the papers and excerpts from the committee reports of the greatest interest to veterinarians generally.

Cattle Breeders' View of Bang's Disease Control*

Mr. Hill of Wisconsin gave an interesting account of his experience with cattle diseases. Mr. Hill's experience extends over a period of more than 50 years. For more than 46 years he has been a breeder and importer of purebred Guernseys.

The speaker's experience with tuberculosis began in 1888 and cost him a good-sized fortune, the loss being heavy every year until the disease was finally eradicated from his herd only a few years ago. His experience with Bang's disease began in 1891 and he estimates that up until three years ago, when the disease was eradicated from his herd, it cost him altogether between $50,000 and $100,000. During no year in the period from 1891 to 1934 did he escape loss from the disease. One heifer was discussed that dropped her first calf all right and then aborted four times in succession, milking continuously for 1430 days and giving a heavy flow of milk all the while. Following this she calved normally for a number of years.

In all his experience with Bang's disease Mr. Hill only twice was induced to try abortion remedies. Early in the present century he procured 100 pounds of methylene blue at a cost of $75 and used it until everything about the place was blue, but to no avail as far as Bang's disease was concerned. Early in the war when the price of methylene blue skyrocketed he sold what was left (18 pounds) for $240. Thus he is probably the only cattle owner that ever made a profit on abortion dope.

"People are still spending enormous amounts of money for remedies. Both from the knowledge that I have gathered from scientific authorities and by the experience that I have had as Commissioner of Agriculture, I know not only what an enormous amount of money has been spent and is being spent for remedies, but the worst of it is the false hopes that have been built up in the farmers' minds, especially when perhaps for a few months or even a few years, they happen to be free of the disease and give very strong testimonials for a particular remedy."

Referring to Wisconsin's experience in the control of Bang's disease, he said that Wisconsin was the first state to permit only animals free of the disease to be shown at the state fair, and also the first to prohibit the exhibition of any but animals negative to the agglutination test at county fairs, this regulation going into effect in 1930. He stated that in the past three years approximately 1,000,000 cows have been tested for Bang's disease in the state, but still many questions about the disease cannot be answered. Some of these questions he gave as follows:

1. Why does infection sometimes reappear in a herd despite every effort?
2. Why do animals that are positive and even herds that are positive sometimes calve normally?
3. Why do animals that are negative sometimes lose their calves under conditions simulating infection?

Public sales have been great sources for the spread of Bang's disease. A year ago Wisconsin prohibited the sale of any except negative animals at public auction, and recently this regulation has been modified to prevent the transfer of any but negative animals from one herd to another. Already the health departments of 15 to 20 cities in

* Hill, Charles L., Madison, Wis., Chairman, Dept. Agriculture and Markets, Madison, Wisconsin.

Wisconsin require that their milk must come from Bang's disease-free herds, or that it must be pasteurized. Mr. Hill thinks the time is not far away when there will be a large number of cities with similar regulations and that if the large cities demand freedom from Bang's disease of herds that furnish their milk supplies, that the dairy industry will be up against a compulsory cleanup program.

Chief of the TB Eradication Division.

In the anticipation of such requirements Wisconsin has already set up a state brand butter. At the outset the requirements provide among other things that 50% of the milk must come from Bang's disease-free herds, and after 1939 all of it must come from such herds.

In conclusion Mr. Hill said: "I am sure that we are going to be able to eradicate this disease. It will mean millions and millions of dollars every year to the dairy industry. Experience with a clean herd as compared with an infected herd will be just a different sort of life.

"Those of you who are working as veterinarians and control officials in furthering this program, should have a very great sense of satisfaction in being able to serve the live stock industry in this way.

"The farmers naturally must look to you veterinarians and control officials for guidance. I am sure that they will have the same clear-headed foresight in leadership that has made it possible to eradicate TB.

"There is nothing that should cause a farmer to wait for a vaccination program to be developed, because if it takes, as it will, several years to clean up a herd by that method, the loss in the meantime will be greater than by cleaning up now by elimination of reactors."

Progress of Bang's Disease Work*

Accomplishments of Federal-State Bang's Disease Project was the subject of a report by Doctor Wight. Pointing out the considerable increase in the number of herds and cattle placed under supervision in this project, he cited figures showing a 50% increase in the number of herds and a 27% increase in the number of cattle during the 12 months ended October 31, 1937. Attention was called to the varying proportions of breeding cattle under supervision in the different states, varying from more than 50% in three states to less than 10% in 18 states. The average for the entire country is approximately 15.4%.

During the fiscal year ended June 30, 1937, agglutination-blood tests were applied to approximately 8,000,000 cattle, of which about 5% were reactors. Owners of reacting cattle received an average Federal payment of $26.45 and, in addition, an average salvage of $27.94. In those states in which an additional state payment was made, the amount paid by the state averaged $9.07 per head. The average appraisal of reacting cattle was $70.67. Records of the work also show that about 9% of reactors were registered cattle.

In practically all the states most of the work is conducted under the individual-herd plan. In 17 states, however, county-wide testing under the area plan has been in progress in a total of about 200 counties. The speaker discussed developments in research work on Bang's disease with special reference to vaccination studies. Field experiments are being conducted in about 285 herds containing approximately 20,000 cattle. Although about 5,000 calves have been thus far given the vaccine, the experiments have not progressed far enough to warrant conclusions.

Doctor Wight concluded his address by thanking persons who have cooperated in the project and paying tribute to Dr. W. E. Cotton, recently retired, for his valuable research work on Bang's disease while superintendent of the Bureau's Animal Disease station.

* By A. E. Wight, Washington, D. C., Chief of the Tuberculosis Eradication Division, Bureau of Animal Industry.

Undulant Fever and Its Relation to the Public Health*

This problem is one of concern not only to the health officer, but to the livestock breeder and to the dairyman. Any solution which while protecting man ignores the vast economic problem of Bang's disease in cattle is but a makeshift remedy which must be ultimately supplanted by one which will serve to eliminate the infection from its livestock reservoir. Conversely, the control program among cattle must be such that it does not entail an undue risk to the milk-consuming public.

It is recognized that contact infection may be avoided through the observance of suitable precautions even though from the practical point of view this is often all but impossible. It is also recognized that infections of the general population may be avoided through pasteurization of milk which is practical for the urban communities but is not practical on a universal basis as yet in the rural areas. Such solution while protecting the public health would still offer no solution to the economic problem of Bang's disease. This latter problem may be attacked either from the point of view of slaughter of reactors or from the point of view of vaccination. The latter solution would appear preferable when and if it can be shown that use of the vaccine is not attended with a risk of transmitting infection through the milk to the milk-consuming public. The speaker doubts if it can be said as yet that this risk does not exist. When it can be shown that the use of the vaccine is most effective from the point of view of controlling the disease among livestock and is devoid of any such risk, we will then have a solution that meets the needs of both public health and the industry. Until this freedom of risk can be shown we must as health officials urge and even insist upon the pasteurization of the milk from these vaccinated cattle. The ultimate solution will come only through the co-operation between the industry and public health officials, this co-operation depending upon the mutual realization that each party has problems of its own and that neither one should be satisfied with a solution which while protecting its own interests ignores the interests of the other.

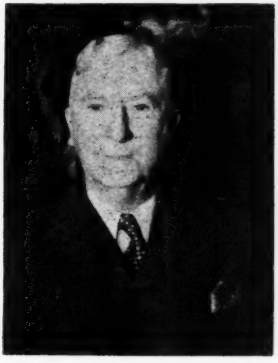
* By Gaylord Anderson, Minneapolis, Minn., Professor of Preventive Medicine and Public Health, University of Minnesota.

* * * *

Progress in Tuberculosis Eradication Campaign*

The skepticism of the earlier years was recalled in contrast to present confidence in tuberculin testing and the general efficient conduct of the work.

During the period November 1, 1936, to October 30, 1937, 93 counties were added to the list of modified accredited areas. Thirty-seven municipalities in Puerto Rico were likewise placed in the same status. Since November, 1936, four states — Pennsylvania, Maryland, New Jersey, and New York — have received Federal recognias modified accredited areas. This noteworthy progress leaves only two states, California and South Dakota, that have not yet achieved a modified accredited status.



Dr. C. N. McBride, Chairman, Committee on Transmissible Diseases of Swine.

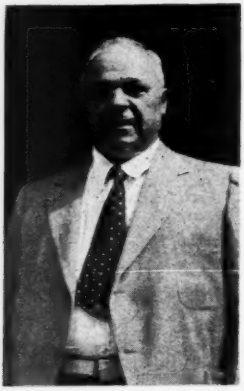
Public interest in tuberculosis-eradication work has been manifested throughout the campaign. In recent years the admission of several states to the modified accredited area has been celebrated by "Achievement Day" exercises.

Although eradication of tuberculosis from cattle has received principal emphasis during the course of the campaign, avian tuberculosis has received much attention also. The effect of avian tuberculosis on

* By A. E. Wight, Washington, D. C., Chief of the Tuberculosis Eradication Division, Bureau of Animal Industry.

swine has been the cause of considerable concern. Doctor Wight reported the inspection of approximately 128,000 poultry flocks by field veterinarians. These men not only observed and made physical inspection of fowls, but tuberculin tested a large number of them. Reports indicate that of approximately 1,200,000 birds, about one-sixth were infected.

In connection with tuberculosis of hogs, Federal meat-inspection records for the



Dr. A. F. Schalk, Chairman, Committee on Milk and Meat Hygiene.

last fiscal year disclosed that 9.3% of approximately 36,000,000 hogs slaughtered under Federal supervision showed some evidence of tuberculosis.

The speaker concluded his address by expressing appreciation for the splendid co-operation rendered by livestock owners, veterinary officials, and others associated with the work.

Holstein Mother and Her Bull-Calf Triplets.

The Eradication of Tuberculosis From the Herds of New York State*

This project had its inception during May, 1918. From that time to the present it has been the goal of all concerned to have New York State recorded as one of the accredited states of the Union. The problem was a large and costly one and required the tuberculin testing and retesting of 153,000 herds, representing 2,000,000 cattle, at a cost, for indemnity alone, of $57,000,000, of which $46,000,000 was paid by New York State and $11,000,000 by the Federal government.

The percentage of tuberculosis was high and the disease was deep-seated in a large number of our extensive dairy counties. From the beginning the area plan of testing was adhered to, with emphasis on the importance of thorough cleaning and disinfection.

In bringing the state to the point of accreditation 965,000 tuberculous animals have been removed from the herds and slaughtered, and the extent of this disease has been reduced from approximately 40% in 1919 to less than 0.5% at the present time. New York now has 145,000 accredited herds and 8,000 herds which have passed either one or two successful tests, only a small percentage of which showed infection on the last test.

If the 965,000 tuberculous animals which were condemned, removed from the herds and slaughtered, were placed head to tail the line would reach from New York City to a point 136 miles west of Chicago, or a total distance of 1,096 miles. These same animals if placed in cattle cars, allowing 25 animals to a car, would make up 38,600 carloads or 386 trains of 100 cars each.

The fact that New York State is now listed as a modified accredited area does not mean that the tuberculin testing has been completed or that tuberculosis eradication can be classed as a project completely finished.

We shall continue to retest the accredited herds in one county where the initial

* By E. T. Faulder, Director Animal Industry Bureau Dept. of Agri. and Markets, Albany, N. Y.

infection was very low once in three years, in four additional counties once in two years, all accredited herds in the remaining counties annually, and continue this practice until every bovine animal in the state, 2,000,000 in number, can be classed as "accredited."

Importance of Meat Inspection of Poultry to Public Health*

It was pointed out that with minor exceptions the only poultry inspected at the time of slaughter is canned poultry. It was also pointed out that production of poultry is a seasonable industry and that vast quantities of poultry are killed, plucked and stored undrawn in refrigerating plants. When this poultry is distributed to retailers, it is permitted to thaw out and putrefaction within the intestinal contents soon charges all the tissues with gases, causing a marked lowering of the palatability of the meat. Where the birds are not promptly disposed of, this putrefaction may extend to the flesh, lowering its quality, and even rendering it unwholesome. It was also pointed out that tuberculosis is very prevalent throughout all the middle west poultry-products area and that hundreds of thousands of tuberculous birds are condemned at the canneries. Such birds going into the general trade (other than as canned poultry) are rarely eliminated, and while it is recognized that the avian tubercule organism is but slightly pathogenic for the human, cases of human tuberculosis due to the avian tubercle bacillus do occur. The speaker is surprised that the poultry industry, for its own protection and in the promotion of a better market, does not insist upon antemortem and postmortem inspection of its product as is carried out for other meats.

Dr. E. T. Faulder.

*By C. E. Edmunds, Supervising Inspector of Poultry, Chicago, Ill.

Trichinosis in Swine and Its Relationship to Public Health*

In addition to giving a review of the historical facts that lead to the discovery of trichinae in human beings and swine, and the recognition of the pathogenicity of these worms, the speaker reviewed the early work on trichinae carried out in the Federal Bureau of Animal Industry. He discussed the incidence of trichinae in about eight million hogs examined by Bureau microscopists from 1898 to 1906 to meet the requirements of foreign trade. The incidence of infestation with these parasites was about 2%.

Recent work carried out by the speaker showed an incidence of trichinae of less than 1% in non-garbage fed hogs; in hogs fed garbage as collected the incidence was about 4.5%; in hogs fed cooked garbage the incidence was about 0.5%.

Experimental studies on trichinosis in swine, based on the speaker's investigations, showed that these host animals failed to show clinical symptoms unless heavy doses of larvae were administered to young pigs. In some instances heavy doses of larvae proved fatal, the experimentally-infected pigs dying before the larvae became encysted in the muscles.

For the control of trichinosis in human beings and swine the speaker recommended the swine sanitation system as developed by the Federal Bureau of Animal Industry, the control of garbage feeding with a view to eliminating the feeding of uncooked garbage, the inauguration of meat inspection in communities which lack this essential public service, thorough cooking of pork in the home and in public eating places, and a comprehensive campaign of education to acquaint consumers with the danger of eating raw or inadequately cooked pork and products containing pork muscle tissue that have not been adequately cooked or cured.

* By Benjamin Schwartz, Washington, D. C., Chief of the Zoological Division, Bureau of Animal Industry.

Dr. Benjamin Schwartz.

Little has been added to our knowledge of trichinosis in swine since the report of W. C. W. Glazier, Assistant Surgeon, Marine Hospital Service, made to the Senate of the United States in 1879. The relationship of this disease to public health is the critical issue, not only to consumers of pork, but to the swine industry. The McClean system of swine sanitation is not necessary to control trichinosis in swine. So far as observation goes, the growth, development and feeding of swine is not materially influenced by trichinosis, and as for protecting the consumers of pork from trichinosis, the swine sanitation system is totally inadequate, since it has no place in the scheme of fattening hogs on garbage.

Educational campaigns on the necessity of cooking pork products also are inadequate. Such campaigns have been stressed by the Bureau of Animal Industry for a quarter of a century, but notwithstanding this effort, in a large section of the country 15 to 20% of the human population is infected with trichinosis. But for the educational work of the Bureau, perhaps a much larger portion of the population might have been so affected. The educational campaign falls short, because it does not reach or does not influence a great many consumers of pork, and because many of those whom it does reach and who are convinced of the danger of eating raw pork, consume it unknowingly. The family that stops at the roadside hot dog stand and orders frankfurter sandwiches certainly think they are buying beef, and think it is cooked. But the facts are that it often contains pork, and is seldom thoroughly cooked. It seems reasonable to suppose that much trichinosis is acquired in just this way. Then there is the undoubted source in uninspected packing plants from which sausage and sausage meats are distributed without the necessary measures having been taken to destroy the trichinella organism.

At the present time it is apparent that the trichinosis problem is a serious one in this country. Maurice C. Hall's investigations have completely demonstrated that. It is also apparent, so far as investigations have gone, that it is chiefly due to hogs fed on raw garbage. For the safety of the public and the welfare of the swine grower the matter should not be temporized with. Public health departments are becoming aware of the menace of trichinosis. The information is filtering into the medical profession. Some of these days the lid may pop off, and swine producers and packers see a large portion of their market for pork disappear overnight. Fortunately, garbage-feeding of swine is in the main conducted in large units. Garbage-feeding establishments are located in proximity to our cities. Policing such establishments offers no insurmountable difficulties. In states where the laws authorize it and political pressure permits it, livestock sanitary authorities should take the necessary steps to compel the cooking of all garbage before it is fed to hogs. Hall has laid this problem in the lap of the packing industry, urging that the packers having federal meat inspection should refuse to purchase such hogs, throwing them all into the channels of intrastate trade. Nothing else would so quickly bring about state meat inspection. The packers do not want the responsibility of stopping the feeding of raw garbage to hogs. They would pass it along to the swine producer where nothing to correct this situation will be done, or hand it to the state live stock sanitary authorities, where the problem is likely to be solved on

the same day that rabies is eradicated by these same agencies.

Meat from uninspected plants is probably the chief source of trichinosis in man, but while the large packers compete with local abattoirs for the privilege of slaughtering garbage-fed hogs, they will be looked upon, should public opinion become aroused in this matter, as being tarred with the same stick. The packer must not forget "The Jungle." Should the present investigation of the quick freeze demonstrate its adequacy for destruction of the trichinella they will be in the clear if and when the explosion occurs, otherwise their market must suffer with that of others.

However, the Association adopted a resolution declaring trichinosis in man and animals to be a result chiefly of feeding raw garbage to swine, and the control of this matter to be a responsibility of the various state livestock sanitary authorities and the state and city health departments, and pledging the cooperation of its members in bringing about the control of the disease.

Dr. Fred Eagle, vice president of Wilson and Company, in a discussion of Dr. Schwartz's paper presented the packers' view of the matter, which is that they cannot control the rearing and feeding of swine. Incidentally he called attention to the many ways in which the packers cooperate with the Bureau of Animal Industry to safeguard the health and welfare of the consumers of meat and meat products.

Mr. E. Z. Russell, formerly a farm paper editor and at one time a swine expert in the employ of the United States Department of Agriculture but now a garbage feeder, in a long discussion iterated and reiterated his hope that the matter of trichinosis in men and swine would be given no newspaper publicity and deplored without end the attention and publicity the matter has already received. Mr. Russell's 45-minute speech can be summed up in a few sentences:

1. Scientific investigation shows that trichinosis in man and animals is a result of feeding raw garbage to swine, but personally he is not convinced that rats do not have something to do with it.

2. Requiring that garbage be cooked before feeding it to swine would place additional labor and cost on the garbage feeder and might wipe out all his profits.

3. There is a large amount of money invested in garbage-feeding plants, in which garbage feeders have a vested right, which together with the profits to be expected from such an investment, should be respected by the government.

4. He is willing to see city public health departments undertake the eradication of trichinosis, but first he wants them to eliminate rabies, typhoid fever, tuberculosis and other diseases more important than trichinosis.

It was laughable the way Mr. Russell deplored and implored and cautioned against the use of headlines and at the same time he furnished enough headlines to supply all the sensational writers on the subject for the next half dozen years.

"Let the people die," says Russell; "the profits of garbage feeders are sacred," and Russell says, "feeding garbage to hogs has resulted in the deaths of 300 persons, but discontinuing the practice would injure garbage feeders financially," are but two of several hundred headlines that could be taken from Mr. Russell's speech with but little change in wording, and no change in implication. He questioned the wisdom of the "Cook Pork Thoroughly" signs the B.A.I. supplies for retail meat shops. He thinks such signs may lead the public to think there is something wrong with pork. Any such impression would lessen the use of pork and thus lessen the profits of garbage feeders.

The Association was keenly interested in the subject of trichinosis, and there is every evidence that the problem will receive careful study during the coming year. Except for Mr. Russell, there was no inclination on the part of anyone to minimize the importance of the problem. It appears that additional legislation may be necessary in some states to give the live stock sanitary officials authority to prevent the feeding of raw garbage to animals going into the general channels of trade.

Dr. A. E. Cameron in a very brief discussion pointed out that Canada long ago

prohibited feeding raw garbage to swine, because of the swine diseases disseminated in this way, and now that the problem of trichinosis had arisen, Canada has it already solved. He pointed out also that in England they had long required the cooking of garbage fed to hogs as a protection against foot-and-mouth and other diseases. In fact, it appears that except in the United States, the prohibition on the feeding of raw garbage is the rule, simply as a matter of lessening the dissemination of diseases in this way. It has, of course, long been recognized in this country that uncooked garbage is a prolific source of hog cholera.

* * * *

Transmissible Diseases*

The report of the committee on miscellaneous transmissible diseases dealt with the status of infectious equine encephalomyelitis and anthrax in the United States during the last year and the foot-and-mouth disease situation in foreign countries.

Equine encephalomyelitis occurred in various areas but cases were most numerous west of the Mississippi. In the East it occurred in the same general area as in previous years—along the Atlantic Coast from New Jersey to Florida. Cases in the Middle West were noteworthy for their greater number than in any previous year, preliminary estimates being more than 100,000, with a mortality of about 30%. In the more northern states west of the Mississippi, the disease made its appearance from July to late September; farther south, from July to early November. In the East most of the cases occurred in August and September.

As a preventive measure, stabling the animals at night and otherwise protecting them against blood-sucking insects gave good results in comparison with leaving them on pasture. Sufficient information is not yet available to justify definite conclusions as to the efficacy of anti-encephalomyelitis serum and vaccine. Experimental work in Nevada, however, in which live virus was used alone and in combination with anti-serum, indicated that simultaneous injection of serum and virus is much preferable to the use of virus alone, because of the additional safety factor.

Anthrax in a highly virulent form appeared during the summer months on more than 1,000 premises in 46 counties of South Dakota, and in northeastern Nebraska. To assist in handling the situation, the Federal Bureau of Animal Industry detailed more than 50 veterinarians to these states. The following measures were carried out: Quarantining infected premises, cremating the carcasses, and recommending to owners the vaccination of all exposed cattle. Since observations show that cattle respond to vaccination better when it is carried out well in advance of the anthrax season than during an outbreak, the committee recommended early vaccination.

Foot-and-mouth disease, which for a period has existed only to a slight extent in northern European countries, spread greatly in several of them during the last six months of 1937, France and Germany being particularly affected, and to a less extent the Netherlands, Belgium, Switzerland, and Great Britain. Evidence was presented showing the concern of England over the situation, based largely on the apparent introduction of infection through imported fresh meat and other products.

This report, excellent from most points of view, treated animal plagues with a casualness suggesting something in test tubes in laboratories, and not matters vital to the welfare of the public, and even the very existence of civilization. The committee told us, for instance, that there has been a widespread outbreak of foot-and-mouth disease in Germany, Belgium, France, and England, but did not state that in the country where it first appeared, it was spreading rapidly at last reports, and has already confronted the German government with a serious problem in decreased production of butter, which was already rationed in insufficient amount; that the disturbance of trade and loss of young stock will soon intensify the deficiency of meat and meat fats in the German Reich, and if not brought under prompt control may lead to famine,

*By A. W. Miller, Washington, D. C., Chairman, Committee on Miscellaneous Transmissible Diseases.

Dr. O. V. Brumley, President, A.V.M.A., presented a paper on Veterinary Education and Training for Public Health.

just as animal plagues throughout all the past history of mankind have lead to famine, pestilence, and social disturbances of the gravest import.

Nor is the importance of anthrax in our own country emphasized. The committee might have stated that anthrax has long been enzootic in southeastern Dakota. History and tradition carry its prevalence back to the days before the white man saw the country. For a long time the areas where the disease was indigenous changed but little. Of late years it has spread and new foci of infection now occur over parts of Nebraska and Iowa. At fairly regular five-year cycles it flares up, occasioning heavy loss, as it did last summer, and in 1932 and in 1926, to mention only three enzootics. At least once in the past anthrax ruined a nation. Perhaps its potential destructiveness justifies taking it more seriously. The same statement is in a measure true of the discussion of encephalomyelitis of horses. The loss of more than 30,000 horses in farm communities at the height of the harvest season, with 70,000 additional incapacitated, is more dramatic than a table of figures. Equine encephalomyelitis is just about our No. 1 mystery disease.

Problems Arising in the Federal State Bang's Disease Project*

When the elimination of cattle affected with Bang's disease was inaugurated as a project by the Federal government in 1934, in co-operation with the states, it was well known in advance that many problems would be encountered. More than three years have now passed since this work was started. Some of the problems over which we deliberated during the last quarter century, probably are still with us, and I feel certain, after reviewing the mass of reports I have on the subject many new ones have arisen which plague not alone the owners of livestock but sanitary officials as well.

Many of these new problems relate directly to conditions in the field, on the farm, and apply more definitely to sanitation, herd management, and administration of the program in general, than they do to laboratory technique and the various methods of diagnosis; however, in a few reports, the limitations of the agglutination blood test are called to attention.

It is recognized throughout the co-operative agreement which the herd owner is required to sign before the herd is officially tested that co-operation from the herd owner is of prime requisite, and that common sanitary practice, which in this particular malady must include, also, proper herd management, is fundamental.

We know only too well from our past experiences, not alone with the eradication of Bangs disease but of tuberculosis as well, that rigid sanitary procedure must be followed; that the premises following the removal of the diseased animals still harbor the causative agent; that the introduction of cattle of questionable health status, also, those highly susceptible to disease, as replacements only serve in many instances as inflammable fuel to the smoldering fire of disease.

Success to the enterprise will be dependent largely upon education and more education, and the importance of this is quite adequately expressed in the following

* By Dr. A. J. DeFosset, Columbus, O., Inspector in Charge of Tuberculosis Eradication and Bang's Disease Testing for Ohio.

quotation: "The secret of success is constancy to purpose."

It has become apparent that a very large majority of the cattle owners having the infection in their herds are in great need of correct information. Many have been sadly misinformed. It is for this reason that we would stress education, and if we find ourselves lacking in this most important detail, our problems, which already in the minds of some have pyramided until they have become monumental in stature, will continue to grow and become more numerous and perplexing. Many problems that are encountered in Bang's disease elimination will be solved when we have better co-operation from the herd owners and a better understanding on their part of the nature of the disease.

The problem which continues to be of major importance and of concern in most of the states engaged in co-operative Bang's disease work is the one relating to persistent infection in certain herds, even after several tests and the removal of the reactors. Some of the factors mentioned as causes for this condition are:

1. Lack of coöperation and indifference to sanitation on the part of the herd owner. Specific instances which are cited are as follows:
(a) Failure to provide maternity stalls.
(b) Lack of thorough cleaning and disinfection.
(c) Lack of interest in the blood test except when abortions occur.
(d) Difficulty of convincing the owner that a cow with an apparently normal calf by her side may be a reactor.
(e) Reactors are kept on premises too long following their appraisal (30 days is too long).
(f) Refusal to eliminate the reactors following a test.
(g) Failure to submit all eligible cattle for the test.
(h) Making replacements from untested herds and from auction markets without previous test.
(i) Additions are not properly segregated.

The aforementioned are all factors that are not beyond the control of the herd owner, if he had a genuine interest in ridding his herd from infection.

There are other factors also which may give birth to problems over which the owner of the herd has no control. Many states report them as follows:

2. Suspects.
(a) Too many suspects which later become positive.
(b) Suspects rarely are segregated from the herd.

3. Problems in general.
(a) Abortions in negative herds.
(b) Aborting cows failing to react.
(c) Cows react which have never aborted or given any breeding trouble.
(d) Abortions not caused by Bang's disease.
(e) Failure of veterinarians to properly advise owners.
(f) Interference in project due to use of vaccine and abortion cures.
(g) Difficulty of making retests at proper intervals.
(h) Difficulty of assembling cattle in range districts.
(i) Unscrupulous dealers.
(j) Removal of cattle from auction markets back to farms.
(k) Smuggling cattle across county lines.
(l) Lack of state legislation.
(m) Unofficial, informative testing.

We are able now to visualize more clearly some of the problems confronting the officials who supervise Bang's disease work. These problems were reported from 42 of the 48 states. Several, of course, stand out more prominently than others. A solution of many of those over which the herd owner has no control rests largely, we believe, with the scientists and others connected with diagnostic and research work. In studying these problems there must be a very close co-operation between the workers in the field and those in the laboratory.

A considerable number of the animals classed as suspects later are found to react. Oftimes the retests on this class of cattle are not made until after the animal has aborted. No small number of the sanitary officials in the field believe herd history should be taken more into consideration when classifying the so-called doubtful animal or suspect.

Our problems are numerous and difficult but we must not permit them to confound us. It may be found as we proceed in our attack on this particular malady that additional weapons may come into use. We had problems quite similar to these in the early period of our tuberculosis eradication campaign, and no remedy proved quite so effective as the inauguration of the area plan. Better methods of attack were constantly

being developed as that campaign progressed, and it would be distressing indeed if, without our extended experience and our wealth of knowledge, our resourcefulness and inventive spirit has ended.

* * * *

Swine Erysipelas*

History is just as important to a study of the various infectious diseases and maladies of livestock as it is to the study of political of economic factors in the life of a nation. It is by the records made today about the livestock diseases and their control, that tomorrow we will be able to build a more solid foundation for the development of a more valuable livestock industry.

With these plain and simple statements we wish to point out the importance of keeping, in definite form in the different states and territories, more complete records on the infectious livestock diseases, regardless of species affected. As a result of sending more than a hundred questionnaires to live stock sanitary officials and others for the purpose of assembling data on this subject, I strongly recommend to this organization that careful studies be made and methods set up whereby more accurate and complete information may be procured from our various livestock sanitary officials about the incidence of infectious livestock diseases.

The organism, *Erysipelothrix rhusiopathiae,* has been known to exist within the United States for more than a half century. It has been identified with various disturbances in different species of domesticated animals. But for more than 40 years it was said the disease, swine erysipelas, did not exist in the United States to an economically important degree. But for the past seven years, we have had every right to question the soundness of this attitude.

The first time that the positive importance of this organism was made public was when Creech connected it with diamond skin disease in 1921. It was further reported by Parker, Lockhart and Ray, in their studies of enlarged joints in swine in 1924. The real recognition of the importance of swine erysipelas came in 1930 when Doctor Fosterman, a practitioner of South Dakota, called to our attention the fact that swine erysipelas existed in an acute septicemic form, causing heavy losses among a large number of swine, involving a large number of herds. Until this date swine erysipelas was still considered a nonentity when tabulating the diseases of our swine industry.

Following Fosterman's report in 1931 of the prevalence of this disease, the picture became entirely different. The positive and undeniable facts presented in January, 1931, caused all the agencies in any way connected with the swine industry, to be conscious of the existence of swine erysipelas. By 1932 we in the middlewestern swine-producing area were convinced that erysipelas is a definite disease entity and one with which it is necessary to reckon.

In this same year the disease became recognized in various other middlewestern states, viz: Colorado, Nebraska, Minnesota, Iowa, Missouri, Wisconsin, Illinois, and New York. During 1933, Wyoming, Kansas, Ohio, and Mississippi were added to the list and in 1934, New Jersey, Maryland, and Georgia were added. In 1935 Florida, and in 1936 North Carolina, Indiana, Oklahoma, Utah and Idaho were added to the list of states in which the occurrence of swine erysipelas was recognized, and in 1937 it was found in Pennsylvania, Tennessee, Washington and North Dakota.

At the present time it appears that erysipelas constitutes from 10 to 17% of the acute diseases of swine in the middlewestern section of the country as a whole.

It is quite evident from the information gathered that swine erysipelas is becoming more important as one of our acute infectious diseases of swine. It extends into practically all states where there is a substantial swine industry. The losses are not entirely due to mortality. There are other economic losses which in most instances take a greater toll than that taken by death of the animals.

The control of this disease is the great problem facing livestock sanitary officials, the veterinary profession, and the swine raiser. In the control of erysipelas it is necessary to take into consideration the high

* By Frank Breed, Lincoln, Nebr., Secretary, Norden Laboratories.

Dr. Brank Breed.

resistance of the organism. It has been reported that it requires 12 days of direct sunlight to destroy it. When the virulent organism is present in meat and bacon it will remain viable for 170 days in these products in the pickling process. In smoked hams it remains viable for over three months. In putrefied meat it remains viable for at least four months.

Chronic carriers which do not appear to be visibly sick may continue to remain on premises and distribute the infection to the soil through the urine and feces, and thus succeeding generations of young, growing, and susceptible pigs are exposed.

One of the greatest menaces to the swine industry, contributing to the spread of acute infectious diseases, is the community sale, which has been developing so rapidly in scope during the past few years. This may be considered as the source of the spread of the infection into non-infected territories. There is no question but what there is too great a traffic in the so-called "tourist" swine, which are transported from one community sale to another in the hope that some unsuspecting feeder will eventually take them off the market. Too many animals are moved from premises on which outbreaks occur or in the neighborhood of outbreaks, to sales barns in far-distant regions, even into other states. In these instances they are frequently offered for sale as feeder pigs from drouth area farms. It may be contended that the unthrifty condition of the animals is due to lack of food, or of the proper kind of food.

Such traffic in this class of livestock should be stopped or some means established so that one may determine whether the animals have been previously offered for sale. It might be feasible to demand of the community sale operators where feeder pigs are offered for sale, that they be subjected to the rapid agglutination test and found negative before sale. It is also possible that all swine not sold at their first community sale should be definitely and permanently identified so that if they are removed to another sale the fact would be definitely known.

Some form of public control is necessary if we are to prevent further spread into areas not highly infected at this time. It is felt that swine erysipelas, especially of the acute type, should be added to the list of reportable diseases. It might be advisable in newly-infected areas to require that a quarantine be exercised in order to prevent its spread to non-infected neighboring farms, and also to prevent the transportation of these animals to community sales.

The use of anti-swine erysipelas serum, administered to all visibly sick, and apparently well animals on a given farm, has been practiced with quite satisfactory results in the majority of cases. But there are some areas in which the disease has so consistently reappeared with each farrowing of pigs, that this method of control is not handling the situation and is becoming too expensive.

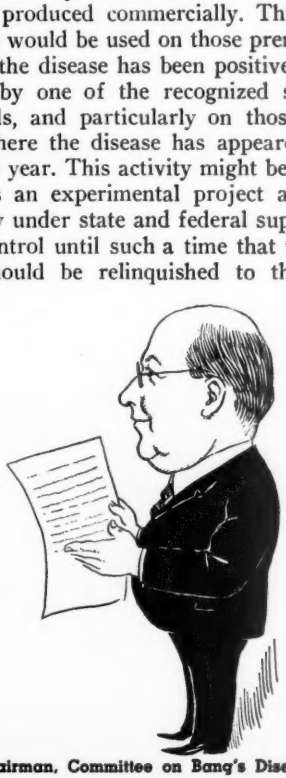
It is reported in Europe and South American countries where the disease exists as does cholera in the United States, that the simultaneous use of erysipelas serum together with the living culture has given satisfactory results.

It would be a mistake to place the control of this disease at this time upon the same basis as that of hog cholera. Without a doubt swine erysipelas would become more prevalent within those states now having the greatest incidence of the disease, and would also be established in new areas within the states where the disease does not now exist. However, it has for some time been felt by the writer and others interested in swine diseases, that there are certain areas in which the use of simultaneous vaccination for this disease could do no harm. This should be approached cautiously and on a definite and well thought out plan. If the U.S.B.A.I. could see its way clear to cooperate with the livestock disease control agencies of those states in which the disease has been most prevalent, in the formulation of such a plan, it would assist materially.

Dr. C. C. Hisel, Chairman, Committee on Revision of Constitution and By-Laws

Dr. T. O. Booth, Fort Worth, Texas, Chairman, Committee on Tick Eradication.

The plan would include an arrangement to permit the state authorities to designate a state controlled laboratory to prepare the living culture to be supplied to competent practicing veterinarians. This would be used simultaneously with anti-swine erysipelas serum produced commercially. This living culture would be used on those premises on which the disease has been positively diagnosed by one of the recognized scientific methods, and particularly on those premises where the disease has appeared from year to year. This activity might be entered into as an experimental project and kept entirely under state and federal supervision and control until such a time that the control should be relinquished to the practicing veterinarian or the method discontinued if found wanting.



Chairman, Committee on Bang's Disease.

A Practitioner's Problems In Swine Sanitation and Disease Control*

One hesitates to attempt the discussion of such a threadworn subject as sanitation, because the fundamental principles involved have been so thoroughly discussed in the past and because the need for and details of sanitation seem so obvious. However, when we consider its supreme importance in any livestock venture and the appalling thoroughness with which sanitation is sometimes neglected, undoubtedly we are justified in the repetitions necessary to keep the subject constantly agitated.

Livestock sanitary problems vary with the species, and due to their peculiar mode of life, there is no species in which sanitation is of more importance than in swine. Sanitary problems also vary with natural conditions, such as the climate, the contour and the soil, and with man-made conditions, such as the concentration of, the confinement of and the traffic in animals.

As the swine industry developed, and hog profits increased, our appreciative swine-raisers, in the approved American fashion, built ever bigger and bigger swine barns. The climax was reached shortly after the World War when many of these structures were suggestive of cathedrals erected in honor of these, his lordship, the hog. Unfortunately, some of these stately swine barns have seemed to serve more as mausoleums than as cathedrals. With their high ceilings, roof windows and concrete floors they are so cold and damp that swine prefer other quarters, especially old straw stacks. Either the cold houses or the half-exposures around the stack furnish ideal conditions for swine flu and pneumonia. Other ornate hog houses were soon surrounded by yards so infested with swine diseases that swine profits were turned to very real deficits. The greater the investment in such swine equipment, the more reluctant is the farmer to forsake it for more hygienic quarters, and therefore, the more disastrous his investment.

*By W. A. Aitken, Merrill, Iowa.

Being unable to see the microorganism responsible for the maladies, the average man is prone to blame the weather, the feed, the presence of any visible parasites, though relatively harmless, or even signs of zodiac for his troubles.

Time and patience are necessary to teach him of the true cause of his misfortune, but too frequently all efforts are completely cancelled by the advice of some overly wise neighbor or the diagnosis of some remedy salesman.

When finally convinced that preventable infectious conditions do exist, we next must sell the swine raiser on the value of such an unspectacular remedy as sanitation. In selling sanitation we must overcome first the influence of his predecessors who recognized no such infections as plague the swine raiser of today and who were able to raise swine successfully perhaps in the very quarters in which he is now having trouble. Then we must counteract the optimistic promises of the very active swine remedy industry whose advertising and sales talk keep alive in the average man an unbounded faith in the mysterious benefits to be derived from the simple use of any drug, chemical or biologic, bearing an impressive name.

If the money spent for lay medication were applied wisely for sanitary measures, our swine diseases would be greatly reduced. Vermifuges, for instance, in addition to being a very inefficient method of combating swine parasites are frequently used where very few if any parasites exist. Although much less true now than prior to the depression, many breeders still treat their swine regularly, thus relieving their consciences if not the animals. A few postmortem or fecal examinations may stop this oft-times needless expense. The same is more or less true of many other hog nostrums, tonics, and to a certain extent, even of the mineral mixtures indiscriminately sold by the high pressure vendors. The men selling these products probably look as intelligent and talk as convincingly as the sanitarian, and have, in addition, a tangible remedy which to many persons seems far more practical than theories about avoiding invisible microorganisms.

Report of the Committee on Rabies*

Rabies is one of the oldest of recognized, contagious diseases of man and animals Rabies was reported as early as 1300 B.C.

Dr. H. C. Rinehart, Chairman, Committee on Rabies.

There is no excuse for the continued existence of a disease that causes the anxiety, suffering and expense that rabies does when measures for its control, and even its complete eradication, are known and are comparatively easy to carry out. Thousands of dollars worth of livestock and many valuable dogs are destroyed each year as the result of bites of rabid dogs. The number of persons required to take the Pasteur treatment because of having been biten by rabid dogs, or otherwise exposed to the disease, is each year becoming greater.

All warm-blooded animals are susceptible to rabies, but dogs are the most common disseminators of the disease. The ultimate suppression and eradication of rabies in both man and animals is therefore dependent upon the adoption of measures that will effectively check the disease in dogs. This requires the active and intelligent cooperation of dog owners, public health and livestock sanitary officials, police officers, veterinarians, physicians and the general public.

That rabies can be completely eradicated from a country has been demonstrated in England, Ireland, Denmark, Norway, Sweden, Holland, Australia and Hawaii. England's eradication of the disease through compulsory muzzling of all dogs and a six months quarantine of all imported dogs has become almost a classic in medical history.

To successfully control and eradicate rabies, the veterinary profession and the medical profession must come to a common understanding. The states all depend on

* By H. C. Rinehart, Springfield, Illinois, Chairman.

Left: Dr. H. R. H. Kernkamp presented a report on Protective Immunization in Swine Diseases.

Dr. J. L. Axby, Committee on Tuberculosis. He was elected first vice president at this meeting which puts him in line for the presidency next year.

quarantine measures and the destruction of stray, homeless dogs.

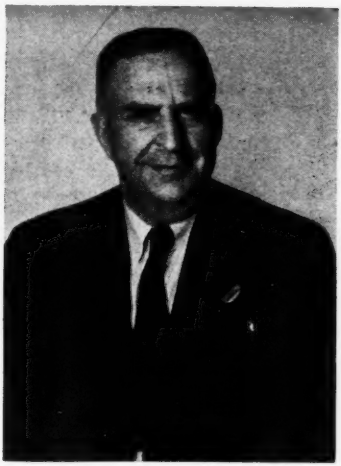
Two states recommend vaccination and do not mention quarantine, but the consensus of opinion of the chief veterinarians of all states is that strict quarantine, vaccination of owned dogs and the destruction of strays are necessary measures.

Records show that Illinois has more rabies than any other state. Reports from 98 counties of 102 counties in the state show claims aggregating $221,475.67 presented to the county boards for the year of 1936, and 181,277 as the number of dogs assessed. These claims are for damage to livestock due to dogs. The percentage of claims paid was 77.48%. It is the belief of this committee that there are 1,000,000 dogs in the state of Illinois.

The information this committee has received from the various states indicates that rabies can be controlled. The disease has been eliminated from certain areas by quarentine and sanitary police measures alone. This has also been accomplished by vaccination, together with quarantine and strict sanitary police measures. Sole reliance on vaccination has not been satisfactory, except where a large majority of the dogs have been vaccinated and the strays eliminated.

Report of the Committee on Policy*

Among other things this committee repeated its recommendation of recent years that the Association extend its efforts for the collection of veterinary vital statistics. It recommended also that a department of



Dr. W. J. Butler, Chairman, Committee on Policy.

veterinary vital statistics be established in the Bureau of Animal Industry and that the U. S. L. S. S. A. begin at once the collection and monthly publication of such statistics.

Increased Susceptibility to Respiratory Infections

Vitamin deficiencies are now generally becoming recognized as a causative factor in the infections of the respiratory tract. Deficiencies of certain or all of the vitamins must be considered in the infections of the nose, throat and sinuses. However, it must be understood that vitamins are not a cure-all for diseases, but must be looked upon as a useful and necessary adjunct in the treatment and the prevention of disease. Bircher-Benner states that neither prophylaxis nor therapeutics can be completely effective unless sufficient quantity of the vitamins are available to the human economy.—G. M. Koepcke, M.D., in the *Journal Lancet.*

*By W. J. Butler, Chairman, Helena, Mont.

Horse and Mule Association

The 18th annual meeting of the Horse and Mule Association of America was held in Chicago December 1st. An ever increasing number of veterinarians attend the annual meetings of this association. A still larger number would attend them if veterinarians generally, realized the value of the programs to them.

Estimates made by the Bureau of Agricultural Economics, U. S. Department of Agriculture, January 1st, 1937, on all livestock, disclose that horses and mules had an aggregate value of $1,739,067,000, which was more than twice the value of all sheep and swine. The value of horses and mules exceeded the value of all milk cattle (cows and heifers two years old and over, kept for milk) by more than 475 million dollars, and exceeded the value of all beef cattle (that is, all cattle other than those kept for milk) by more than 728 million dollars. In fact, the value of horses and mules was almost equal to the combined value of all beef cattle, sheep and swine.

It is well to realize, also, that of the 6,812,350 farms reported by the census of January 1, 1935, 4,138,433 were under 100 acres in size. On these farms, because of their small size and the fact that they are family farms, there is little likelihood that horses and mules will be materially displaced. There are 1,404,297 more farms that are from 100 to 174 acres in size, and as pastures and meadows usually take half or more of this acreage, leaving less than 100 acres for tilled land, there is little justification for attempting to use other types of power than animals. This leaves only 1,269,620 farms of larger size, on which to justify the use of mechanical power for part of the work, when feed costs are high: but in the long run, over many years, animal power is cheaper even on such larger farms.

This means that farmers in the central west who raise horses and mules have assurance of a continuing market for their surplus, not only to neighboring farmers who do not raise work animals, but also to a large, steady market in the east and south.

These facts should hearten all horsemen, for they should realize that they are connected with an industry that has more invested capital than any other, the animals in which contribute most of the power for the economical production of the pastures, forage, hay and grain needed to produce and finish all other classes of livestock.

The program included:

1. Horse Power On Farms, by William Hirth of the *Missouri Farmer*.

2. The Brood Mare—What the Records Show On Approximately 1,000 Individuals, by Dr. E. A. Caslick, of Paris, Ky. Doctor Caslick has for many years been the veterinarian for Claibourne and Ellerslie Farms, owned by Mr. A. B. Hancock, and has complete records on the breeding records of more than 1,000 mares. Dr. Caslick's talk was illustrated by lantern slides.

3. Periodic Ophthalmia—Late Developments and Research Trends, by Dr. W. W. Dimock, Head of the Department of Animal Pathology of the Kentucky Agricultural Experiment Station. The sum of $41,000 has been raised from various private sources for research into periodic ophthalmia within the past year, and Doctor Dimock is in charge of the research. Periodic ophthalmia is a menace to all breeders of horses, especially to those who have valuable animals. Secretary Dinsmore has received reports from 565 veterinarians in 48 states who reported 8,240 cases observed during the years 1936 and 1937. Assuming that the veterinarians not reporting saw a proportionate number, indicates a total of 148,320 cases of periodic ophthalmia during that two-year period.

Doctor Dimock proposes beginning his investigation on the assumption that periodic ophthalmia is an infection probably due to virus and continuing either until he determines the cause or definitely proves that the condition is not infectious. This seems rather surprising in view of the fact that most research in the past into this ail-

ment has indicated that the disease is not infectious. It would seem that undertaking this research with an open mind would offer promise of speedier conclusion.

4. Some Reasons Why the E. B. McLean Race Horses Headed the List of Money Winners in 1928, by Dr. Robert Lee Humphrey of Virginia. Dr. Humphrey's preparation of these horses for winning consisted essentially in feeding a better ration than race horses are ordinarily given—giving particular attention to the calcium-phosphorus balance in the ration.

5. Control methods in Infectious Equine Encephalomyelitis, by Dr. John R. Mohler, Chief of the Bureau of Animal Industry, U. S. Department of Agriculture.

Doctor Mohler states that reports from the 1937 outbreak of encephalomyelitis, which was the most extensive outbreak that has yet occurred in this country, show that under comparable conditions the incidence of the disease among vaccinated animals was 13%, and among unvaccinated animals 32%. He regards this as an unsatisfactory showing for the vaccine, indicating that it must be improved in efficiency before we can rely upon it. In the interim, he suggests the protection of solipeds from mosquitoes and other biting insects during the months of July, August and September by screening the barns, keeping the animals off pastures and the use of mosquito or fly repellant sprays. He counseled the horse breeders present that until more information concerning the treatment of the disease is developed, that hope for the affected animal lies in giving it good nursing, good hygiene, and calling a veterinarian at the earliest possible moment to administer symptomatic treatment. Where these measures were undertaken at the outset of the attack in the recent epizootic, the percentage of recoveries was large—probably 85%. He urged them not to waste their money for so-called specifics or other nostrums.

A detailed account of Doctor Mohler's address is given elsewhere in this issue.

Cholelithiasis in Dogs

Do dogs have gall stones? If so, to what extent and under what circumstances.—*L. T. K., Chicago.*

Reply: The majority of writers on the subject state that the formation of stones in the gall ducts and in the gall bladder is very rare in dogs; though Woodroffe Hill states that gall stones are not infrequently met with in canine practice. Hoare quotes Hill approvingly. Friedberger and Fröhner, too, write that excepting the ox, gall stones occur more frequently in the dog than in other animals.

In the greater number of cases the gall stones are formed in the gall ducts, the ductus hepaticus and its intrahepatic branches, the ductus biliferi, the ductus cysticus, and the ductus choledochus, but seldom in the gall bladder.

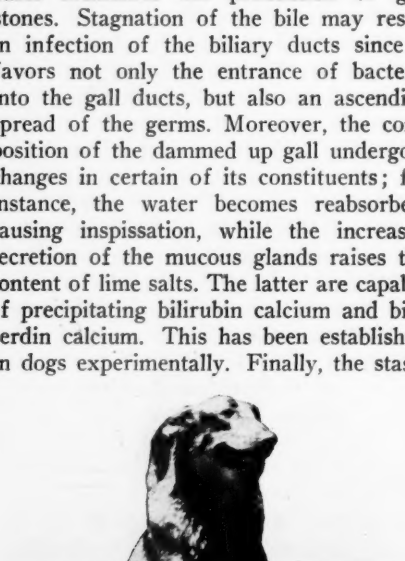
Just how gall stones are formed is an interesting problem which has not yet been solved. Especially the opinions concerning the excretion of cholesterin and the formation of pure cholesterin stones are at variance. The principal cause for the formation of concretions in the bile ducts is to be found in infection. Inspissation and stasis of the bile, though sometimes contributory causes, are not in themselves the exciting factor.

According to Joest, infection of the bile takes place through bacteria entering the gall ducts. The germs in question (*Escherichia coli, Proteus vulgaris*) enter, as a rule, from the intestine *via* the ductus choledochus. Their entrance is facilitated by means of parasites, foreign bodies, or duodenal ingesta.

The parasites, which may give rise to infection of the bile ducts in dogs, are the ascarids and the tapeworms. Their accidental entrance into the gall ducts always gives rise to infection. However, to what extent, and under what conditions the infection, induced by the parasites, is responsible for the stone formation, is another question.

It is also known that dead parasites, fragments of parasites or parasite eggs, favor the formation of concretions. They form a

starting point for the excretion of stone forming matter from the bile and thus become the nuclei of gall stones. It is obvious that the entrance of foreign bodies or of ingesta into the gall ducts must carry infection into them and in time lead to congestion of the latter. Infection started in this way, quite often leads to the formation of concretions, the foreign body or parts of the introduced ingesta becoming the nucleus of a developing gall stone. It should be understood, however, that it is not merely the presence of the foreign body, but as a rule its rôle as an infectious agent, which produces the formation of concretions. Rarely will a sterile foreign body enter the gall ducts. A primary stasis of the bile has been observed which does not result in its infection. The sterile changes wrought in the dammed up gall only in exceptional cases stimulates the production of gall stones. Stagnation of the bile may result in infection of the biliary ducts since it favors not only the entrance of bacteria into the gall ducts, but also an ascending spread of the germs. Moreover, the composition of the dammed up gall undergoes changes in certain of its constituents; for instance, the water becomes reabsorbed, causing inspissation, while the increased secretion of the mucous glands raises the content of lime salts. The latter are capable of precipitating bilirubin calcium and biliverdin calcium. This has been established on dogs experimentally. Finally, the stasis of the bile produces a degree of placidity in the flow of secretion which is productive of crystalline precipitations.



Infection of the gall ducts leads to inflammation in them, and to a disintegration of the bile. In chronic infection a stasis of the bile results, due to the impeding effect of the inflamed walls of the ducts upon the flow of the bile. As a rule, the inflammation is catarrhal. It is connected with an increase in the desquamation of epithelium and an increase in the production of mucus from the mucous glands. As a result of the catarrh, the mucous glands which are rather scant in carnivora, develop in large numbers. Their secretions increase the calcium content of the bile. The desquamated and disintegrated epithelial cells form, not only a source of cholesterin, but also often form the center about which collect the solid particles precipitating out of the disintegrating bile. In this way they become the nuclei of concretions.

Protein-containing mucous flocculations, which often form as the result of catarrhal cholangitis, as well as fibrinous and serous protein substances which often appear in the bile during severe inflammatory processes of the gall bladder cause precipitation of bile constituents and especially of calcium pigment. These organic substances are also capable of forming the nucleus of developing concretions.

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The bacterial disintegration of the bile applies to the majority of its constituents and will cause precipitation of all particles participating in the formation of stones such as cholesterins, calcium phosphates, calcium carbonates, bilirubin calcium, biliverdin calcium, magnesium carbonate. The mucus and the calcium and magnesium salts originate principally from the secre-

tions of the gall ducts and the gall bladder. The disintegration of the bile acid salts through the action of bacteria seems to play an especially important rôle in the formation of gall stones since it is the cholates that keep the cholesterin in solution. Consequently, when the cholates disintegrate, the cholesterin is precipitated. The color and the composition of the gall stones depend naturally on the constituents of particles precipitated out of the bile.

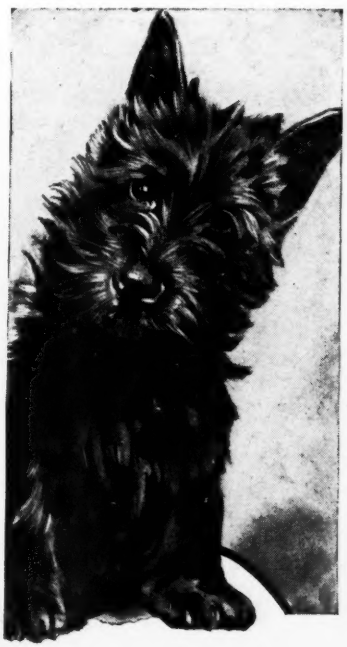
In many cases the gall stones are latent and cause little or no disturbance. Small gall stones usually do not produce any symptoms, but are carried through the ductus choledochus into the duodenum and are passed out with the feces unnoticed. In exceptional cases the gall stones may disintegrate *intra vitam* spontaneously and may even become redisolved in the bile. Naturally, no disturbance would be expected.

In many cases gall stones produce no symptoms and are accidental findings at necropsy. Large gall stones, however, are apt to obstruct the flow of bile and produce icterus. In occasional circumstances, especially when the surface is not rounded smooth, the stone may become lodged in the ductus choledochus, when swept into it by the flow of bile, causing dilation of the duct. The symptoms produced are unrest and pain (gall stone colic). Vomiting has been observed at times. Dogs suffering from chronic cholelithiasis (angio-cholitis) become apathic. When the calculus formation continues and the flow of bile becomes impeded entirely, icterus gravis will develop. In the latter case the feces are pale or clay-colored. Occasionally swelling of the liver may be noted. The liver may then be sensitive to pressure, especially the portion situated more ventrally. In cases of pronounced ectasia of the gall bladder and of the ductus choledochus, an irregular, firm, and upon pressure painful, tumor-like mass, or an irregular cord can be demonstrated in the region of the ventral epigastrium upon deep paplation. Roentgen ray photography will aid in the diagnosis.

Since catarrhal inflammation of the gall duct will also cause cholelithiasis, it is difficult to decide in the majority of cases whether the thickening of the wall, usually found co-incidentally with the gall stones, is the cause or consequence of gall stones. As a rule, infection and stasis have a complementary action upon the formation of gall stones, whereby the stasis may be the cause or consequence of an infection of the biliary ducts.

When a gall stone remains in the same location for any considerable length of time it will produce a local pressure atrophy of the mucosa and a thickening of the connective tissue in the wall. If a stone exerts a more vigorous pressure, as in the case of a wedged stone, then a pressure necrosis of the mucosa develops; it is a form of decubital necrosis which leads to the formation of pressure ulcer.

Recently, during a routine necropsy of 155 dogs, Schlotthauer and Stalker observed two cases of cholelithrasis which they reported in the February 1936 issue of the *Journal of the American Veterinary Medical Association.* F. V.



Feline Auricular Mange

By CARL WILLIAM SCHULTZ,
Independence, Missouri

Practitioners are more often faced with parasitic clinical entities than with any other type of disturbed well-being, and although response to treatment is usually prompt the early diagnosis of the condition is of primary importance.

Otacariasis, epilepiform disease, auricular scabies, parasitic otitis, otodectic mange or ear mange of cats is, by all odds, one of the most common affections of these animals. Perhaps, by a large number of veterinarians, it is not diagnosed; or, more likely still, its importance is not fully recognized. Fully 75% of all cats, especially the long haired varieties, are affected with ear mange. It is quite contagious, and quickly and easily spreads from animal to animal.

The causative agent of this type of mange is *Otodectes cynotis,* var. *felis,* a species of mange mite of the family *Sarcoptidae,* which may infest one or both ears of the animal.

Owing to their size, and the fact that they do not burrow, it is often possible to see these mites with the naked eye moving slowly about in the external auditory canal. A collection of the *debris* from an affected ear collected with a cotton swab, on microscopical examination, will disclose large numbers of the parasites. A brief description of Otodectes may be of interest and useful in making a diagnosis.

The microscope discloses a parasite which is slightly larger than the canine sarcoptic mange mite. The abdomen is lobed posteriorly. Four pairs of legs are present, the anterior three being most visible due to their projecting considerably beyond the margin of the body. All legs are marginal and terminated by ambulatory suckers on the first, second and third pairs of legs in the male, and on the first and second pair in the female, (Fig. 1). A demonstration of these parasites to the owner of the animal is impressive.

The irritation due to the invasion of the parasites, their puncturing the tissues and feeding on the serum, sets up an otorrhea of the external auditory canal, which, among other sequences, interferes with the normal production and disposal of ear-wax. As a result, an adherent, soot-colored powder and a fetid wax with other detritis and scales will be seen in the aural cavity. Ulcerations of the canal and granulation tissue may develop in cases of long standing.

The affected animal shows symptoms of pronounced pruritus which leads to scratching the affected part, resulting in excoriation and bleeding, loss of hair, dermatitis and abrasions of surrounding parts. Epileptiform seizures are not an infrequent accompaniment; in fact, "fits" in cats are most often caused by these parasitic invasions; thus, failure to diagnose the condition often leads to improper treatment of the patient. If the animal is kept in warm surroundings, the warmth has a stimulating effect to the parasites and the epileptiform spasms become more frequent and pronounced, resulting in a sullen, ill-tempered animal. Shaking the head is a significant manifestation and examination is resented. A severe sequel, a result of neglecting treatment, is cerebral complications, manifested by the patient walking in circles with the most severely affected ear towards the center.

The treatment is relatively simple if the correct diagnosis is made early. An extensive and complete cleanup of the entire external auditory canal is the preliminary step. An aid to this end is the application of hydrogen peroxide which loosens up the *debris* and permits its easy removal with a cotton swab. The swab should be rotated as it enters the deeper parts. One of the following preparations should then be administered twice daily: One part carbon tetrachloride and three parts castor oil, which may be alternated every other treatment, with one part chloroform and nine parts castor oil. In cases presenting considerable suppuration beneficial results have

been obtained by first cleansing the ear thoroughly with a cotton swab, which has been immersed in ether, followed by the application of boric acid to the affected part, or the following prescription may prove effective:

℞ Acidi tannici ..... ʒ i
Acidi salicylici ..... ʒ i
Alcholis q.s. ad ..... ʒxvi
M. ft. solutio.
Sig.: Swab external auditory canal twice daily.

When the suppuration has been satisfactorily overcome, the following prescription may be instilled:

℞ Tincturae metaphen ..... ʒ i
Glycerini ..... ʒiv
Spiritus aetheris nitrosi ..... ʒiv
M. ft. solutio.
Sig.: Inject into external auditory canal twice daily.

After the injection, the canal should be closed for five to ten minutes with a pledget of cotton. This is to delay the evaporation of the ether. The ether causes the remedy to penetrate the waxy lining of the canal which contains parasites.

The feline subject furnishes fertile ground for the invasion of *Otodectes cynotis* as evidenced by the large number of cases presented for treatment. The one of recent occurrence, hereinafter described, is illustrative.

A Typical Case

A black, female kitten, age approximately six months was brought in with a history of epileptiform seizures occurring as frequently as a dozen times daily. The owner had been treating the animal for fleas and internal parasites, with no apparent benefit. The symptoms were inappetence, ill-temper, depressed attitude, pronounced shaking of the head and an offensive odor.

Upon examination both ears were seen to be literally filled with fetid discharge. The microscope revealed a smear of the detritus to be teeming with Otodectes.

The treatment consisted in first loosening the debris with a cotton swab immersed in ether, followed by swabbing thoroughly with the first prescription. The following preparation was applied twice daily with massage: One part carbon tetrachloride and three parts castor oil, alternated with one part chloroform and nine parts olive oil.

After following this prescribed method of treatment for five days, the patient made an uneventful recovery and was discharged from the hospital.

ODODECTES CYNOTIS
VARIETY FELIS (CATI)
ADULT FEMALE
TAKEN FROM SPECIMEN.

In conclusion it is desired to emphasize two factors of utmost importance: first, that otorrhea produced by these parasites is in the majority of cases the cause of spasmodic fits in cats, and second, that correct diagnosis is vital.

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Mastitis Data

In studies[41] carried on over a period of three years with three herds totalling 271 cows and representing varying degrees of mastitis infection, it proved possible to maintain a herd relatively free from cows which produced abnormal milk, although it was not possible to maintain a herd free from cows which discharged mastitis streptococci in the milk. Of all first-calf heifers in the experimental herds, 36% discharged mastitis streptococci in the fore-milk during the first week of lactation.

[41] Hucker, G. J., and E. S. Harrison, 1937. The Maintenance of a Herd Free from Mastitis; State Agr. Ex. Sta., Geneva, N. Y., Tech. Bul. No. 246.

Control Methods in Infectious Equine Encephalomyelitis*

By JOHN R. MOHLER,
Chief, Bureau of Animal Industry,
Washington, D. C.

Two years ago I had the pleasure of attending your annual meeting and at the request of your secretary, Mr. Dinsmore, I presented a paper on the general subject of infectious equine encephalomyelitis, or, as it is more commonly known, "sleeping sickness" of horses. You will remember that during that year, 1935, we experienced what was considered a very severe outbreak, particularly in many of the states west of the Mississippi; and that the estimated number of cases was well over 30,000 with a mortality ranging from 97% in the East to a low of 10% in the West. Last year there was a decided lull in the incidence of sleeping sickness, only about 6,000 cases being reported for the entire country.

Before discussing the subject which Mr. Dinsmore has selected for my talk today, that is, "Late Control Measures in Infectious Equine Encephalomyelitis," I should like to review briefly this year's outbreak. I may say that as in previous years I have sent out questionnaires to the various state officials and to our own Bureau men stationed in the field, requesting information on what I deemed the important points relating to the disease as it occurred in 1937. While the returns from these questionnaires are not as yet all in, we have sufficient data to give you a fairly good bird's-eye view of the situation this year.

The earliest case coming to the Department's attention occurred in the latter part of May in a northern district of Florida and this was followed by scattered cases in the same state throughout the summer and early fall. Our laboratories examined a number of specimens from Florida and confirmed the diagnosis of encephalomyelitis by microscopic study, but were unable to recover the specific virus which is the causative agent of the disease. Other sporadic cases occurred during July, August, September and early October in Georgia, South Carolina, North Carolina, Virginia, Maryland and New Jersey. There were probably only several hundred positive cases in these states and the area affected was confined largely to the rather narrow strip of land bordering the Atlantic coast line. This year for the first time the causative virus was positively identified in brain specimens obtained from cases in Georgia and South Carolina. Previously, we had succeeded in isolating the virus from New Jersey, Delaware, Maryland, Virginia and North Carolina. It was of great interest to us and I may say a rather fortunate circumstance that the virus recovered from all these infected eastern states was found to be strictly of the eastern type. You may recall that we have two distinct types of virus, the eastern type, just mentioned, which has thus far remained confined to the Atlantic seaboard area, and the western type which causes the disease in states bordering the Mississippi and those west of that river. Let me point out here that the eastern virus engenders in the horse and mule a very acute and usually fatal disease, the mortality ranging from 80 to 100% of affected animals, while the western virus is considerably less virulent, the losses occasioned being at times as low as 10% to as high as perhaps 50% of the affected stock. We will consider the two types of virus later when we take up the discussion of control measures and you will then perceive how significant the type of virus may be.

This year's outbreak assumed its greatest importance in the territory west of the Mississippi river. From reports that have come to our hands to date, I estimate that there were at least 100,000 cases of the disease in this area, by far the most extensive outbreak in recent years and perhaps the greatest of all time. In the early summer (June) a few cases appeared in Minnesota, Wis-

*Presented at the 18th Annual Meeting of the Horse and Mule Association of America, Chicago, Dec. 1, 1937.

consin, and the Dakotas; indeed, at about the same time or possibly somewhat earlier, the disease made its appearance in a narrow strip of country in Manitoba and Saskatchewan bordering Minnesota, North Dakota and Montana. While the infection was gaining headway in this northern area, cases began to develop both to the south and west so that before the middle of August, practically all states south as far as Arkansas and Oklahoma and west to the coast were encountering the plague. A little later Texas was involved in the general outbreak and Louisiana and Mississippi had already experienced some of the disease.

In the more northerly states the peak of the disease was reached during the month of August. In the middle tiers of states the highest incidence was attained in late August and early September. Farther south the greatest number of cases occurred from mid-September to mid-October. In general, in practically all districts the disease extended over a period of about two and a half to three months, with a peak period of about two weeks' duration beginning about one month after the first cases appeared. As a typical example of how the disease developed in the West, I may cite the reports received from one of the midwestern states which suffered very heavy losses. Here the first cases were diagnosed about the middle of July and the last to be observed occurred before the middle of October. The peak of the disease extended from about the 20th of August to the 10th of September.

From this, you will note that sleeping sickness is a strictly seasonal disease occurring principally in the late summer and early fall, to disappear quite abruptly with the coming of cool weather or the first frosts. Moreover, in all the districts in which the disease was prevalent, conditions were favorable for the development of mosquitoes and large numbers of these and other blood sucking insects were in evidence all during the outbreak. This is in line with our present conception of the manner in which the disease is spread, i. e., by infected mosquitoes. In our laboratories, as well as those of other agencies which are investi-

Dr. John R. Mohler.

gating the disease, it has been shown quite poses and early in this work found that conclusively that certain species of mosquitoes can acquire the infection by sucking the blood of an infected animal and subsequently such mosquitoes can convey the disease through their bites to healthy susceptible animals. While the outbreak was at its highest this year I detailed two of our experienced laboratory men to points in the West where the disease was most prevalent. These men cooperating with entomologists from our Bureau of Entomology and the local practicing veterinarians made many valuable observations which tended to confirm our views on the insect transmission of the disease. It may interest you to know that these workers actually took their guinea pigs and other equipment out in the insect-infected pastures and woodlands and conducted their experiments on the grounds where the infection existed. In other words, they transported the laboratory to the field. Bureau veterinarians from our field forces were also detailed in certain areas to assist in controlling the epizootic.

Now let us consider what means we have for controlling the disease. A few years ago

the Department began experimenting with vaccines intended for immunization purposes and early in this work found that brain tissue which contained the causative virus after special treatment with formalin was capable of bringing about a high degree of resistance in small laboratory animals. Encouraged by these findings the vaccine was tried on horses and found to protect at least 85% of the animals which were given two doses at an interval of about two weeks against a dose of virus sufficient to kill normal horses. The vaccine was tried in the field and while it did not protect all animals treated it reduced the case incidence of the disease very considerably. For the past two years this product has been manufactured by commercial houses and used in the field to a considerable extent. This year in one state where the disease was especially active, more than 20,000 horses were vaccinated with the formalized brain tissue vaccine with the result that the incidence of the disease in the treated animals was about 13%, while in untreated horses in the same area over 32% of the animals contracted the disease. These results, while lending a ray of hope to the solution of the problem of control of sleeping sickness by vaccination, are still not all that should be expected, and the need for further improvement of the vaccine is quite apparent.

Two years ago in my talk before your meeting I announced that our laboratories had obtained very promising results in immunizing hogs against cholera by means of a new vaccine referred to as the crystal violet vaccine. I also told you that the method used in preparing this vaccine would be tried in the manufacture of a sleeping sickness vaccine. Our laboratories set to work at once experimenting with the new method, but after many trials found that vaccines so prepared did not give results which warranted further experimentation along this line. Our efforts are now being directed toward perfecting the older type vaccine and we are stressing the positive need for using the appropriate type of virus for preparing a vaccine to be employed in a given area. Thus, vaccine to be administered in those states bordering or west of the Mississippi should be prepared from western-type virus.

While artificial immunization through the use of vaccines and other agents is a very popular and appealing method of attempting to control infectious diseases and no doubt will always find application in many of our animal plagues, I believe that, at present, particularly as regards sleeping sickness, not enough thought is being given to the possibilities of control by taking advantage of our knowledge of the nature of and manner of spread of the infection. I refer, of course, to the insect transmission of the disease. Other insect-borne infections have been controlled by eradicating or controlling the insect vector. Mosquitoes have been accused of being a carrier of the sleeping sickness virus. What can be done to control these pests in the areas where the disease exists? Extermination can hardly be accomplished or even hoped for for a long time to come, although much can be done to check the development of mosquitoes. What can be done and is being done on many farms is the protecting of the horse stock from attacks by blood sucking insects by adopting appropriate measures. These consist of stabling horses at night in screened stables and the use of sprays both for the destruction and repelling of insects. During the day the animals may be protected by fly nets or burlap coverings and spraying with the insect repellants. An effective and rather inexpensive spray material may be prepared by extracting pyrethrum flowers in kerosene for 48 hours, using one pound of the flowers to a gallon of kerosene. Two parts of this extract are then thoroughly mixed with one part of water containing 3 to 5% of soft soap. The mixture is now ready for use. The Department will be pleased to furnish upon request published matter on methods of controlling mosquitoes, flies, and other insects (Farmers' Bulletin 1097, "The Stable Fly," Farmers' Bulletin 1570, "Mosquito Remedies and Preventives," and a mimeographed article on fly sprays and control of flies on dairy cattle and around dairy buildings.)

It has been found that where horse owners have taken pains to protect their animals from the attacks of blook-sucking insects the incidence of the disease has been greatly reduced. I can cite many quite striking examples of this kind. Probably the best illustration of how large numbers of horses escaped the disease through application of these measures is shown by the experiences this year at some of our army posts. At 12 such establishments, all located in the midst of the infected areas and with a total horse population of 6,366, only 29 cases of sleeping sickness developed, or less than one-half of one percent of all the horses. I may further say that 14 of these cases, or about one-half the total, occurred at one post where it was necessary to pasture the animals, but fortunately here only three of these animals died. Little or no specific serum or vaccine was used on these animals.

I realize quite as much as you do the difficulties of carrying out a program of protecting a group of horses from insect pests, but certainly with valuable animals the trouble is well worth while and as I have mentioned before, many owners have taken up this work seriously and obtained very satisfying results.

Before closing, I should like to say a word about treatment of the disease and utter a warning about the use of the so-called cures. When the disease becomes well established, i. e., when the central nervous system is definitely involved and the usual nervous or sleepy symptoms develop, there is no specific remedy for the disease. So far as medicinal treatment is concerned the application of appropriate symptomatic treatment by a competent veterinarian is all that can be done. Here I may cite the reports received from a group of seven veterinarians practicing in districts where the disease was especially prevalent and virulent this year. Those veterinarians administered most of their treatment by the stomach tube, intravenously, hypodermically, or by the rectum, and of about 900 cases treated, only about 25 percent were lost. It goes without saying that the fatal cases would probably not have been benefited by any kind of treatment.

During this years' outbreak, both in our own country and in Canada, many thousands of dollars were spent on the so-called specifics administered by the "handy man" in every neighborhood—which nevertheless were worthless treatments, and I cannot urge too strongly that all of you should do everything possible to discourage the sale and use of such nostrums. For treatment, the Department's advice may be stated very simply thus: Good care and careful nursing with appropriate symptomatic medication by your veterinarian.

U.S.D.A. Exhibit

As has been its custom for the past 16 years, the United States Department of Agriculture again displayed a spectacular educational livestock exhibit at the International Livestock Exposition in Chicago, November 27 to December 4.

One of the most varied in subject matter of the Department's exhibits to be presented to the half-million livestock enthusiasts who annually attend the "International". The 1937 exhibit included material of interest not only to stockmen and farmers but to the thousands of others who annually attend this mammoth exposition. The exhibit makes use of unusual mechanical devices, life-like models, beautiful dioramas, striking lighting effects, color, and live animals to portray government livestock activities.

Widespread interest has been evidenced in the various foreign breeds of livestock that have been imported by the Department for experimental study during the past few years. Designed to acqaint livestock producers with the use to which such foreign breeds are being put in the Department's breeding research program, was an exhibit entitled, "Swine Breeding Research". Thousands of American stockmen had their first opportunity to see the Danish Landrace breed of swine, two live barrows of this breed being a feature of the exhibit.

Because of the importance of adequate feed supplies of high quality in economical livestock production programs, considerable space was devoted to this subject.

New light was thrown on the perennial question of the relative value of steers and unbred heifers for the production of beef. There is little practical difference between the two.

Another feature presented a complete picture of the horse-bot problem and means for its solution.

The feature, "U. S. Meat Stamps—What They Mean to You", emphasized anew the importance of this protection to the meat-consuming public and also portrays the value and growth of the Federal meat grading service.

Drugs Used in Veterinary Medicine

VI. SALICYLIC ACID AND ITS DERIVATIVES

By PROFESSOR VICTOR LEWITUS
New York

Historical Sketch.—The curative effect obtained from various portions of the poplar and willow trees (Salicaceae) such as the bark, leaves, seeds or flowers may be ascribed to the salicin which they contain. Centuries before the true character of these drugs was discovered, the ancients employed them as febrifuges, for the purification of blood and as intestinal astringents. Such prominent personages as Dioscorides, Galen, Oribacius and Avicenna are known to have used various types of willow preparations. Dioscorides early recognized that these plant decoctions had an analgesic and sedative effect.

In the Middle Ages medicines prepared from the crude materials were extensively used for the treatment of rheumatic and gouty diseases. After the discovery of salicin by Leroux (1827), its use as an antipyretic became very extensive, and it came to be considered next to quinine in effectiveness. During the Napoleonic wars, willow bark was used as a substitute for Cinchona bark.

In 1834, Pagensteckar discovered salicyl aldehyde (also called salicylous acid); and in 1838 Piria prepared salicylic acid from salicin, the latter occurring in the bark to the extent of 1 to 8%. It was in 1844 that Cahours prepared the acid from oil of wintergreen (oil of gaultheria) a source which was later replaced by oil of sweet birch. In 1860, Kolbe and Lautemann prepared the acid using phenol in the synthesis, a process essentially in use today. It is of passing interest to note that here we have one of the first drugs synthetized in imitation of nature—a forerunner of present-day chemotherapy! Until its synthesis from phenol, the acid was so expensive that it was used only to a limited extent, but from then on it became more and more popular. In 1875 Thiersch first introduced the acid as an antiseptic, and in the same year Buess demonstrated its antipyretic action in tuberculosis, diphtheria, typhoid and rheumatic fever. There was some question about its efficacy in rheumatic fever, but Strickler (Berlin) and Maclagan (Edinburgh) independently removed such doubts in 1876.

Acetylsalicylic acid (aspirin) was introduced into clinical medicine by Wohlgemuth in 1899, and Boehringer and Soehne did likewise with salicyl salicylic acid (diplosal) in 1908.

Local Preparations and Action

Salicylic acid ($C_6H_4OHCOOH$); also compound collodion or paste.

Methyl salicylate ($C_6H_4OH.COOCH3$)—oil of wintergreen, oil of birch, oil of gaultheria.

Ethyl salicylate ($C_6H_4OH.COO.C_2H_5$).

Mesotan (salmester) ($C_6H_4OH.COO.CH_2OCH_3$).

Phenyl salicylate (salol) ($C_6H_4OH.COO.C_6H_5$).

Spirosal (monoglycol salicylate) ($C_6H_4OH.COO.CH_2.CH_2.OH$).

Salicylic Acid ($C_6H_4OHCOOH$) is an organic compound made from phenol. It occurs as fine white needles or as a white crystalline powder, which is odorless and has a sweet and acrid taste. It is slightly soluble in water (1:460) but freely so in alcohol, ether and chloroform. With the alkaline hydroxides or carbonates, it forms water soluble salts. It is incompatible with iron or its salts, forming dark or purplish products. For this reason a rubber or wooden spatula must be used in making ointment with it or its salts. Externally, it has an astringent action when used in strengths of one to two percent in alcohol or as an ointment. Used as a dusting powder or ointment in strength of two to five percent it is antiseptic and antiparasitic, and even a keratolytic. The latter action, however, is best obtained in stronger concentrations (20 to 60%), especially when used in the form of paste or collodion. Continuous application to the skin may cause slight corrosive effects. In the

diluted forms it is useful in pruritus, urticaria and eczema. In greater strengths, it will cause effective exfoliation of common warts or corns. On mucous membranes it is very irritant and somewhat corrosive. For this reason it is best to substitute one of its salts or other derivatives for internal conditions in animals.

Methyl Salicylate ($C_6H_4OH{\cdot}COO{\cdot}CH_3$) is also commonly known as oil of wintergreen, oil of gaultheria or oil of birch. This points to its original source from the teaberry, or from the sweet or black birch tree. However, the bulk of the oil is obtained synthetically by the reaction between methyl alcohol and salicylic acid. If obtained from natural sources, the leaves of the wintergreen (*Gaultheria procumbens*) or the bark of the sweet birch are steam distilled.

Methyl salicylate occurs as a colorless, yellowish or slightly pink liquid, of light oily character, having the distinct odor and taste of wintergreen or birch beer. It is slightly soluble in water, but very miscible with alcohol. This drug is used externally as an antiseptic and counter-irritant. Rubbed on the skin it produces a long-lasting, mild form of irritation and is slowly absorbed, producing some internal salicylate effect. It is used principally for the relief of pain due to arthritic or neuritic conditions, and also serves to reduce swellings by its counter-irritant properties. It is sometimes administered internally, as are some of the other salicylates, but is known to be much more irritating than sodium salicylate. Its chief use is in the form of a liniment, either pure or in alcoholic dilutions.

Ethyl salicylate ($C_6H_4OH{\cdot}COO{\cdot}C_2H_5$) is the salicylic acid ester of ethyl, or grain alcohol It is analagous to methyl salicylate, but is said to be less irritant and less toxic. One of the newer salicylate compounds, it is a transparent, colorless, volatile liquid, having a pleasant odor and taste. It is insoluble in water, but soluble in alcohol.

Mesotan ($C_6H_4OH{\cdot}COO{\cdot}CH_2OCH_3$) is another newer remedy known as salmester. Chemically, it is methyloxymethyl salicylate and is also analagous to methyl salicylate. It is a clear, yellowish, slightly aromatic liquid, oily, slightly soluble in water, but is readily soluble in organic solvents and oils. It is an active counter-irritant, being more irritant than methyl salicylate, and used locally for arthritic conditions. To relieve local pain and swelling, mesotan is diluted with from one to four parts of olive or cottonseed oil and painted over the affected area about twice daily. Friction should not be used and only light dressings applied. The site of application should be changed after each treatment if possible, and the parts allowed to rest after a few days of treatment, without applications.

Spirosal ($C_6H_4OH{\cdot}COO{\cdot}CH_2{\cdot}CH_2{\cdot}OH$) or monoglycol-salicylate is the salicylic acid ester of monglycol. This is a colorless, nearly odorless, oily liquid, slightly soluble in water, and readily soluble in alcohol, ether, chloroform, benzol and olive oil. Spirosal is used either undiluted or mixed with two or three parts of alcohol, or in a 1:8 mixture of olive oil; or in the form of ointments with equal parts of lard or petrolatum. It usually causes very little irritation on the skin even when vigorously rubbed in, and is absorbed to the extent of from 16 to 20% of the amount used. In this respect it differs considerably from the other external products related to it.

Phenyl Salicylate ($C_6H_4OH{\cdot}COO{\cdot}C_6H_5$) or "salol" is largely used internally, but there has been some recent application of the drug in the dry, powdered form, strong or diluted in the treatment of local conditions, such as ear canker in small animals. It is disinfectant and at the same time locally sedative when so employed. It occurs as a white, crystalline powder, having an unpleasant aromatic (ink-like) odor and a characteristic taste. It is very slightly soluble in water and freely soluble in alcohol. Its antiseptic virtues are due to the slow release of phenol (carbolic acid) and salicylic acid (containing 40% of the former and 60% of the latter).

Internal Preparations and Action

Sodium salicylate, ammonium salicylate, strontium salicylate, lithium salicylate,

phenyl salicylate, salicin, acetylsalicylic acid (aspirin), novaspirin, sal-ethyl carbonate.

Without going into the details of the mode of action, which is still unsettled, salicylates have the following effects when used internally:

1. *In acute articular or muscular rheumatism.*—Large doses have been found to give prompt relief from pain and swelling of the joints. It is not considered due to anti-body formation. At first thought to he specific in their action, the salicylates have recently been shown by Hanzlik to be chiefly due to the antipyretic and analgesic action obtained by massive doses (allowed by salicylates) and possibly from the local circulatory effects in the periarticular tissues. Thus there is a reduction in severity of the symptoms, shortening of the attacks, and mitigated relapses. This applies to muscular rheumatism, neuritis and also chronic forms of the disease.

2. *In gastric or intestinal fermentation.*—The salicylates are antizymotic in their action, inhibiting the development of organisms that induce fermentation.

3. *In febrile conditions they serve as antipyretics.*—Since salicylic acid itself is for the most part too irritant for internal medication, causing gastric upsets, the salts, and more recently the organic salts (esters), have been synthesized. These are quite insoluble and the salicyl radical is liberated only in the intestine, or after reaching the circulation. Even though these recent compounds have no direct effect on the stomach, they often cause nausea and even vomiting in animals, due to stimulation of the vomiting center in the nervous system. It has been found that sodium salicylate when fortified with sodium bicarbonate, is practically as efficient as these new therapeutic agents.

Sodium Salicylate ($NaC_7H_5O_3$) is a white, finely crystalline powder, having a faintly pink tinge; odorless, sweet, salty, very soluble in water and freely soluble in alcohol. It is incompatible with acids and acid salts, with solutions of most aklaloids, such as quinine, and with iron and its salts. As has been stated in regard to internal medication, it is not specific, but is an antipyretic, analgesic and mild antiseptic internally. It is irritant to mucous membranes and may cause vomiting and even abortion in pregnant animals. Its effects last only as long as administration continues. It has been found useful also in iritis, keratitis and glaucoma. It is best given in combination with bicarbonate of soda to avoid precipitation of the salicylic acid by the acid of the gastric secretions.

Ammonium, strontium and *lithium salicylates* are practically the same in action as the sodium salt. The dose of each is the same as for sodium salicylate. Salicin is the glucoside obtained from willow or poplar trees. It is less irritant than the salicylates, but is also less certain in its action, and on this account has been largely superceded by the salts of the acid.

Phenyl salicylate has already been mentioned for local application, but is also useful for its antizymotic (antifermentive) properties. It is not at all soluble in the gastric secretion and for this reason does its work only in the intestine, where it liberates slowly the salicylic acid and phenol, of which it is composed. Cases of poisoning arise from overdosage when large amounts of phenol are liberated. This substance is used as a coating material on pills or capsules intended for dissolution in the intestine, and not in the stomach.

Acetylsalicylic Acid (aspirin) — $C_6H_4COOH \cdot OCO \cdot OCH_3$ and *Novaspirin* (methylene-citrylsalicylic acid) are similar in properties and action. Aspirin is a white, crystalline, odorless powder with an acidulous taste; slightly soluble in water and freely soluble in alcohol. It is decomposed by moisture and by alkalies. With quinine it forms a toxic product known as quinotoxin which has an action similar to digitoxin. It should, therefore, never be prescribed with quinine or its salts. Aspirin acts parallel to the salicylates in general. It is less a central nauseant and appears to be a more efficient analgesic. About 45% of it passes through the body unchanged.

Novaspirin does not appear to have any advantage over aspirin itself.

Sal-Ethylcarbonate is the salicylic ethyl

ester of carbonic acid. It serves the purpose of administering a bicarbonate or carbonate with salicylic acid but has no real advantages over sodium salicylate. It is often combined with aminopyrine in febrile conditions.

Dose Table

		Metric	Apoth.
Sodium Salicylate:			
(Also Ammonium,	H	16. - 90.	ʒ iv -ℨ iii
Strontium,	C	16. -120.	ʒ iv -ʒ iv
& Lithium	D	.4 - 2.	gr. vi -xxx
Salicylates)	Cat	.2 - .4	gr. iii -vi
Phenyl Salicylate	H	8. - 30.	ʒ ii-viii
(Salol)	D	.13- 1.	gr. ii-xv
Acetylsalicylic Acid			
(Aspirin)	D	.3 - 1.	gr. v-xv
Ethyl Salicylate	D	3 - 1.min.	v-xv

Toxicology

The general group of salicylates when given in overdose may produce the following reactions: They may irritate the mucous membranes, causing pain and vomiting. Large doses also are known to produce sweating, increased urination and disturbance in the brain (cerebral congestion and lessened reflexes). There is also renal irritation and albuminuria, due to accumulation of the drug. Due to increased nitrogenous metabolism, there is an increase in the uric acid content of the urine. There may be convulsions, slowing and depression of respiration, and collapse from the depression of the circulation (final lowered blood pressure). Large doses produce abortion and should be avoided in pregnant animals.

The practitioner should remember the cumulative character of the salicylates, and also the possible effects of constant irritation of the gastric mucosa from continuous administration. The use of alkalies will reduce the chances for untoward effects. The danger of over-using salol (phenyl salicylate) with liberation of large amounts of phenol has already been pointed out. Likewise, the use of quinine with aspirin or related compounds (with the production of the toxic "quinotoxin") has already been contra-indicated. Treatment in these instances includes hastening of elimination, pushing fluids, flushing with well-diluted alkalies, such as bicarbonate of soda, and lending support symptomatically to aid the respiratory and circulatory functions which may be threatened.

Recently, Williams and Banting have shown poisoning by acetylsalicylic acid to be basically an acidosis with probably some specific effect on the respiratory center. They found nausea, tinnitus, cerebration, restlessness, stupor, disorientation, dehydration (due to vomiting), slow, deep respiration, acetonuria and reduction in alkali reserve to result from overdosage with the salicylates. Isotonic sodium lactate, intravenously, has been tried on several such cases with success.

Odin has warned against the use of salicylates in the presence of nephritis. It is well known that salicylic acid is not excreted readily in such cases.

Daniels and Eversen have found that aspirin (acetylsalicylic acid) increases the vitamin C content in the urine. The ensuing vitamin C deficiency results in capillary oozing and soreness of the joints. Thus, this drug apparently depletes the store of the vitamin C, or lessens its utilization in the animal body.

Tragedy of Practice

Once, we were called to see a flock of sick sheep, owned by a young fellow who had just moved into the country. He was living in an old shack, and we felt so sorry for him we charged only five dollars for the call—less than mileage.

Imagine our red neck when he pulled out a large, fat wallet, and carelessly extracted a twenty dollar bill from its many comrades.

Later on, we learned his folks back east were worth half a million dollars, and he had come out here for his health. The next year he built a modest $25,000 country home, equipped with every modern electrical convenience.

That was some years ago, but we can truthfully say we have never made the same mistake since.

E. T. Baker.

Moscow, Idaho.

Abstracts

Chaulmoogra for Follicular Mange

After considerations respecting the nomenclature, etiology, old and modern treatments, and after referring to chaulmoogra and its use, the author[3] describes in detail 18 clinical cases of demodectic mange in dogs.

The treatment consisted in the local application of chaulmoogra oil either undiluted or combined with equal parts of olive oil; in the administration of capsules of sodium chaulmoograte. The local and internal treatment was given daily, the intramuscular injections of chaulmoogrol (an ester of chaulmoogra oil) at intervals of eight days, according to the plan of treating leprosy in man. Cures were effected in 83% of the cases treated.

The following conclusions were drawn from this experiment:

1. The chaulmoogrotherapy as used, is a reliable treatment for follicular mange.

2. Owing to the nature of the treatment, it should be administered by a professional, that it may be conveniently controlled.

3. If one injection of chaulmoogrol causes a general reaction, the next one should be of the same dose. The dose should not be increased until the preceeding injection has caused no reaction.

4. If the capsules cause a gastrointestinal inflammation, this treatment should be suspended and resumed only when the diarrhea ceases.

5. The progress of cutaneous lesions should not be cause for alarm, nor should it determine any change in the treatment.

6. As there is a possibility of the animal licking the parts on which the chaulmoogrol has been applied, whenever possible a bandage or other protection should be used to prevent this.

7. The chaulmoogrotherapy tends to cause a marked loss of condition and for this reason the patient should be well fed and at the end of the treatment, a special strength building course of treatment should be given.

8. If the follicular mange coexists with other affections, they should be treated first.

The article is illustrated with 17 halftones of the clinical cases treated in this experiment.

[3] Menezes Gil, Ary, 1937. A Chaulmoogroterapia na Sarna Demodecica; *Boletim Veterinario do Exercito*, 4:9, pp. 238-72, also 2:6.

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Trichomonad Sterility

For many years a condition in cattle has been recognized which is associated with the presence of trichomonads,[5] and characterized by difficulties in breeding, early abortion, endometritis, pyometra, and vaginitis. It is transmitted by coitus, spreads rapidly, and shows all the characteristics of a contagious, venereal disease.

The first indication that trichomoniasis is present is often breeding difficulty or the fact that several animals have returned to the bull after having passed over two periods, and been thought safely in calf. Sometimes a slight discharge from the vagina may have been noted. If the cattle are housed, a small fetus, a few inches long, may be observed in the gutter. Frequently, however, the disease is not recognized until a large part of the herd is affected and cases of abortion are numerous, or pyometra is present.

The character of the discharges varies greatly, from discharge very similar to that normally noticed at estrum, but containing small white flecks or flocculi, to one still very mucoid, but half of which consists of whitish or yellowish-white tough clots, or one which more resembles bad mastitis secretion or colostrum. Discharges like pea soup or of a pronounced brown or even chocolate color have also been described.

Control measures must vary in detail from farm to farm, but are based on the following essentials: (1) The keeping and use of an accurate service register for bulls and cows; (2) examination of all mature females which have had any chance of infection or are suspected for any reason: (3) providing a different bull known to be healthy for virgin heifers; (4) suspension

[5] Stableforth, A. W., Scorgie, N. J., and Gould, G. N. 1937. Trichomonas disease of cattle. *Vet. Rec.* 49:211-223.

of all other service for six to eight weeks; (5) treatment of all affected females, and of all bulls regarding which any doubt exists, if they are to be kept; (6) sending no cows to a neighbor's bull, nor accepting cows for service from other herds and (7) selling no cows for slaughter.

When breeding operations begin again, it is suggested that all cows be examined before service as a preventive measure; though in practice this is difficult of realization. Similarly, it has been recommended that the bulls should be treated after each service. Finally, when the herd is clear, all care should be taken against introduction by way of a neighbor's bull or of his cow or by purchases, and that all cases of genital or breeding trouble receive prompt and expert treatment.

Many workers have recommended the expression of the corpus luteum to induce estrum. No specific treatment is available.

Deleterious Effects of Arsenic

Observations on living animals, as well as post-mortem examinations, indicate that the use of Fowler's solution [4] is usually detrimental to health. Animals treated with Fowler's solution are more susceptible to respiratory diseases and pathological conditions of liver and kidney than are untreated animals. It appears logical to conclude that the feeding of Fowler's solution to farm animals for the purpose of fitting them for showing detracts from their value as breeders because of impairment of fertility and sexual activity, and that it increases mortality among the offspring. Moreover, breeding and immature animals are rendered more susceptible to disease. Among immature animals respiratory and other diseases contracted because of the increased susceptibility due to the ingestion of arsenic tends to interfere with normal growth. Also, detrimental effects on internal organs such as kidney and liver are to be expected among animals of any age.

It has been shown that the presence of arsenic can be detected in the urine, feces, and the hair of treated animals. Use could be made of these facts if it were desired to eliminate such animals from competition in shows and to prevent their sale for breeding purposes.

[4] Roberts, E. and Dawson, W. M. 1935. Effect of Fowler's solution on animals. Bul. No. 413 Agr. Exp. Sta. University of Illinois.

Diverse Injuries of Ascarid Infestations

Ascarids affect pigs more seriously than is generally supposed.[6] By their migrations they cause localized or diffuse cirrhosis of the liver, and several kinds of nonspecific bacterial inflammations in the lungs. Other possible complications are pleuritis, pericarditis, peritonitis, and septicemia. Therefore, when making a post-mortem examination on a pig it is essential to make not only a bacteriological examination, but also a histological examination of the lungs and the liver in order to check against any possible parasitic cause of the disease condition.

"Rhodarsan" in Respiratory Infections

Rhodarsan [8] is a dioxydiamino-arsenobenzol-methylenesulphoxide of sodium, possessing the formula $C_{12}H_{11}C_2NCH_2OSONa$. It is a light, yellowish powder, containing about 20% arsenic. It disintegrates quickly when exposed to air, and has to be kept in ampoules from which the air has been exhausted. It dissolves readily in water, but must not be reheated, else it will decompose.

The drug has been found useful in the treatment of pharyngeal angina and of febrile catarrhs of the upper respiratory tract. Favorable results were obtained likewise in the treatment of botryomycosis of the skin. Dog distemper, demodectic mange, and various forms of cutaneous eczema yield to its application. It is a specific against spirochetosis of rabbits.

The doses for horses is 0.015gm. per kilogram live weight; for dogs and rabbits, 0.03 to 0.06gm per kilogram live weight. Application in the horse is made intravenously. In dogs, the application is either intravenous, per os, or per rectum. In rabbits

[6] Thoonen, J., Verstraete, A., and Bouckaert, J. 1937. Ascaris infestation in pigs. (Transl. title.) *Vlaamsch Diergeneesk. Tijdschr.* 6:77-81.

[8] Binter, A. 1936. The treatment of domestic animals with "Rhodarsan". *Publications Clin. Brno,* 13:1-29.

the drug may be administered intramuscularly, since it does not produce a local reaction in this animal.

Lesions of Hog Cholera

The results of histological examinations of the intestines of hogs which had died from hog cholera, and of control animals, led Walkiewicz [7] to conclude that the finding of a local eosinophilia in the affected areas of the intestine, excepting the ilio-cecal valve, constitutes an auxiliary pathognostic sign in the diagnosis of hog cholera.

Specific Organism in Coryza of Fowls

Hemophilus gallinarum may be isolated readily, in pure culture from the edematous swellings of fowls showing an infectious coryza. The success of the isolation depends on the length of time the swellings have persisted. The cultivation serves as an aid in the differentiation of certain other respiratory infections of fowls in which coryza is a symptom. The extranasal inoculation of chickens with cultures of hemophilic bacilli is attended with reactions at the points of inoculation when given subcutaneously, or in the wattle.

Melitensis Type of Brucellosis Spreading

Human infections with *Brucella melitensis* var. *melitensis* have long been known in southwestern United States. In the literature records are found of occasional human and bovine infections with the *melitensis* variety in various other sections of the United States.[10]

Of 259 American strains which have been studied by various investigators, only 19 (7.3%) were atypical. Although agglutinin absorption tests will not classify an individual *Brucella* strain in the *abortus suis* or *melitensis* group with absolute certainty, yet collected data will give information as to the types of infections in a given locality. A large percentage of the cases of brucellosis in Texas was found to be of the *melitensis* variety, as was to be expected. It was surprising, however, to find that the majority of human cases studied in the North Carolina area and a considerable percentage of the cases in the Kansas area were also of the *melitensis* variety.

Since comparatively few goats are raised in the United States other than in the Southwestern states, the spread of human brucellosis infections with the *melitensis* variety must depend largely on the susceptibility of cattle to this infection. Hence, the reports of cattle infected with the melitensis variety are of great interest.

Preservation of Biological Products

Phenol, used as a preservative in maintaining the sterility of vaccines and antitoxins, decreases in amount when these products are stored in rubber-stoppered vials.[12] It was found that the rubber removes the phenol from the vaccine. This raises the question as to the most satisfactory type of stopper, and the possibility of obtaining phenol resistant stoppers. In the practical use of vaccines, antitoxins, and the like, it is most desirable, if not essential, to determine the phenol content at definite intervals.

Carbon Tetrachloride for Follicular Mange

Rajewskaja[13] reports favorable results in the treatment of demodectic mange in dogs by the following method: The affected areas of the skin are carefully cleansed, and then coated with an application of equal parts of carbon tetrachloride and either linseed oil or castor oil, the treatment to be repeated at intervals of several days. Depending on the extent of the dermatitis, a cure is usually effected in from four to 23 days. The treatment can also be applied to the head,

[7] Walkiewicz, W. 1935. The relationship of intestinal eosinophilia to the histological diagnosis of hog cholera. (Transl. title.) *Wiad. Wet.* (183:469-476.

[9] Delaplane, J. P., Erwin, L. E., and Stuart, H. O. 1936. The isolation of a hemophilic bacillus in pure culture and the reaction of chickens to extranasal inoculations thereof. *Jour. Agr. Res.* 52:377-383.

[10] Evans, A. C. 1937. The distribution of Brucella melitensis in the United States. *Public Health Rep.* 52:295-303.

[12] McGuire, G., and Falk, K. G. 1937. The disappearance of phenols and cresols added to biological products on standing. *Jour. Lab. and Clin. Med.* 22:641-646.

[13] Rajewskaja, Z. A. 1936. Treatment of demodectic mange in dogs with carbon tetrachloride. (Transl. title). *Ssowirtskaja veterinarija* (2):64-65.

without causing irritation of the skin or other untoward symptoms.

Symptoms of Albumin Anaphylaxis

The application of rabbit brain albumin and horse serum for the purpose of sensibilisation and for reinjection may result in anaphylaxis,[11] regardless of whether homologous or heterologous albumin were used. This reaction to heterologous albumin may be designated as heterogenetic anaphylaxis.

Anaphylactic reactions are produced quicker and more intensively by a homologous albumin than by a heterologous one. Brain emulsion regularly causes more violent reactions than horse serum.

The anaphylactic reactions exhibit gradations in their intensity. Depending on the mode of application, anaphylaxis is manifested as depression, excitement, pruritus and vomitus after subcutaneous injection; and as respiratory difficulty, urination and tenesmus after intravenous injection.

When heterologous albumin is used, anaphylaxis occurs much later than when homologous albumin is used.

Blood Studies in Anaplasmosis

Of five healthy bulls between eighteen months and two years of age, four were injected intravenously with virulent blood of cattle affected with anaplasmosis[14]; the fifth was used as a control. In four affected bulls during the incubation period of anaplasmosis, the readings did not change significantly from the normal. In general, in the four bulls during clinical anaplasmosis, the red-cell count dropped severely; in one case it fell below 1,000,000 red cells per cubic millimeter. The white-cell count increased. The differential white-cell count showed a mild lymphopenia, a marked monocytosis, a shift of the neutrophiles to the left, and a marked eosinopenia. During clinical anaplasmosis, the average hemoglobin dropped to 3.85gm per 100cc of whole blood, the oxygen content to 1.07 volumes percent, and the oxygen capacity to 5.64 volumes percent. All of the morphological and chemical changes found in the blood of cattle having anaplasmosis are due either indirectly or directly to the rapid destruction of the red blood cells. The nature of the agents causing this destruction is not known.

Gland Transplantation in Dogs

Thirty-six cross transplants of thyroid glands were made in dogs whose blood cross matched.[15] After 90 days no evidences of living thyroid tissue could be found. Basal metabolic studies were unsuitable criteria of successful takes, as autopsy examination proved finally. The existence of accessory thyroid tissue no matter how grossly small was sufficient in dogs to fill body requirements without addition of foreign gland grafts.

Effects of Incomplete Milking

In a milking test comprising 33 lactation periods in 14 cows, the animals which had been milked incompletely [16] gave on an average 306 pounds less milk per cow than those which were milked completely. Incomplete milking had no apparent effect on the average percentage of butterfat in the milk during entire lactation periods. Incomplete milking did not hasten the decline in milk flow. It did not increase the number of cells or the number of total bacteria, or the number of streptococci in the milk when the averages of all lactations were considered.

Since leaving a pound or two of milk in the udder at each milking does not effect the percentage of fat in the milk, the normality of the milk, the persistency of lactation, nor the health of the cow, the only question having a bearing on whether or not stripping should be practiced on a dairy farm, are the value of the additional milk obtained by stripping, the cost of stripping, and the sanitation of the product.

[11] Konrad, J. 1936. Anaphylaxis caused by the injection of heterogeneous albumin (Transl. title). *Publ. clin. Brno* 13:61-193.

[14] Rees, C. W. and Hale, M. W. 1936. Morphological and chemical studies of the blood of cattle in health and during anaplasmosis. *Jour. Agr. Res.* 53:477-492.

[15] Shafiroff, B. G. P. and McCloskey, K. L. 1937. Isotransplantation of thyroid glands in dogs. *Jour. Lab. and Clin. Med.* 22:553-558.

[16] Woodward, T. E., Hotis, R. P., and Graves, R. R. 1936. Incomplete milking in relation to milk production and udder troubles in dairy cows. Tech. Bul. No. 522. U. S. Department of Agriculture, Washington, D. C.

Hernia Through the Diaphragm in a Dog

Over a period of about six months, a mongrel bitch, 18 months of age and weighing 12 pounds, had exhibited considerable distress in breathing, particularly after exercise, which when excessive, brought about attacks of coughing. Her appetite was normal, but she had progressively lost condition and recently had had periods of vomiting and capricious appetite. Auscultation revealed very indistinct and dulled lung sounds; on the other hand, the heart sounds were very distinct. There was evidence of valvular incompetence. Palpation of the abdomen revealed a surprising emptiness of the cavity, but no sign of foreign body, tumor, or enlarged gland to account for the vomiting and emaciation. A diagnosis of ruptured diaphragm was made. The diagnosis was confirmed by radiograph examination.[17]

Manganese and Lactation Tetany

An examination of pastures and pasture-plants in a study of outbreaks of lactation tetany [21] revealed that pastures with a high incident of lactation tetany were composed of grasses of poor quality. Most of these grasses contained abnormally large quantities of manganese.

Experiments on rabbits showed that the oral administration of sublethal doses of manganese is followed immediately by a temporary reduction in the magnesium level of the blood. The same effect was produced in sheep and cattle when they received approximately the same dose of manganese as they would have received had they been grazing on pastures with high manganese content. It was found, however, that repeated doses of manganese do not depress the blood magnesium level indefinitely.

It has not been shown that manganese is the specific cause of lactation tetany, nor that the disease is due to manganese intoxication.

[17] Rix, J. C., and Leaver, A. E. 1937. Diaphragmatic hernia in a small bitch. *Vet. Rec.* 49:370-371.

[21] Blakemore, F., Nicholson, J. A., and Stewart, J. 1937. Some effects of a high manganese content in the diet of animals with special reference to lactation tetany. *Vet. Rec.* 49:415-422.

Hydrogen Peroxide as an Anthelmintic

A 1.5% solution of hydrogen peroxide [18] in a dosage of two ounces showed a marked efficacy against dog ascarids when all of the compound administered actually reached the stomach or intestine. Despite the fact that all of the dogs vomited after treatment, and expelled at least part of the solution administered, the percentages of efficacy in seven dogs treated for the removal of *Toxocara canis* ranged from 64.8% to 100%. The efficacy of hydrogen peroxide in removing *Ancylostoma caninum* was variable and decidedly lower than that in removing ascarids, ranging from 33.3% to 100%. The peroxide was entirely ineffective in removing *Dipylidium caninum*. It was generally observed that worms which were unaffected by one treatment showed a rather marked resistance to a second treatment. It appears that either peroxide or the oxygen liberated from it exerts some unfavorable influence on the worms.

Treatment of Spirochetosis

Two dogs were artificially infected with *Spirochaeta sogdianum* by subcutaneous inoculation.[19] In both cases the incubation period was five days. One animal had two attacks, in which numerous spirochetes were present in the circulating blood. The first attack lasted eight days, and the second, one day, with an interval of two days. After being free from spirochetes for a period of 44 days, this animal was inoculated with a second strain, and again became infected. A third dog became infected after eating two infected guinea-pigs. Twenty-eight days later the animal was ill and showed photophobia. Numerous spirochetes were found in the blood. On the third day the animal was unable to stand and appeared moribund. The blood was swarming with spirochetes. A dose of 0.5 gram of solganal A, a gold preparation, was administered. The following day the blood was negative, and the dog made an uneventful recovery.

[18] Schwartz, B., and Porter, D. A. 1937. Tests with hydrogen peroxide as an anthelmintic. *Rev. Med. Trop. y Parasitologia Bact., Clin., y Lab.* 3:11-24.

[19] Adler, S. and Ashbel, R. 1937. Observations on *Spirochaeta sogdianum* Nicolle and Anderson, 1928, in laboratory animals. *Annals Trop. Med. and Parasit.* 31:89-104.

Fowl Paralysis Not Readily Transmitted

Results of experiments carried out by Barber [20] do not definitely indicate the successful transmission of fowl paralysis. Intraperitoneal injection of nerve tissue failed to transmit fowl paralysis. The highest percentage of paralysis in any one group was 16%. In some of the control groups a certain number of chickens also developed paralysis.

Pullorin Test Efficient

The sero-agglutination tests do not always yield constant results in the individual birds.[22] An agglutination titer of 1:20 cannot be considered as negative. Intradermal tests with pullorin prepared by a technique analogous to that for Koch's tuberculin yielded results inferior to those of the serologic test, while pullorin prepared by a technique analogous to that for Mirri's brucellin, yielded higher percentages of infected chickens, and therefore permitted of a surer diagnosis. Because of the simple technique and the more reliable results, the latter intradermal test must be considered a valuable diagnostic aid and deserves wider application in practice.

Studies of Moose Diseases

Five moose found ill in northern Minnesota were made the objects of a careful study by Fenstermacher.[24] None was in a good state of nutrition. In one case no fat deposit could be found at all. The temperature in the animals ranged from 101°F. to 102°F. It was noted that the most common symptom was the lack of fear of man. The lungs of two animals were heavily infested with nematodes. Cystic stages of *Echinococcus granulosus* were found in the lungs of two moose. Parasitic cysts were present in the myocardium of three moose. *Cysticercus tenuicollis* were found near the surface of the liver in three moose. *Paramphistomum cervi* was harbored in the stomachs of three moose. *Nematodirella longispiculata* was found in the small intestine of four moose. Cysts in the ovary was observed in two moose. Congestion of the brain was a rather constant condition. Histopathological lesions that appeared indistinguishable from those that have been found in the central nervous system of horses affected with equine encephalomyelitis, found in the brain of several moose has suggested the possibility of the presence of a neurotropic virus as an etiological agent. Attempts to demonstrate the presence of such an agent were followed by negative results.

Peculiarities of Hemorrhagic Septicemia

Hemorrhagic septicemia is more severe in cows in advanced pregnancy, and in recently fresh cows.[25] The pneumonic form is the most common type. Usually the first animals taken sick are the most severely stricken; the outbreak gradually losing virulence. Deaths, as a rule, occur in those first to sicken or in animals in which the course is complicated by pleurisy and emphysema. After an apparent recovery from hemorrhagic septicemia, a relapse may occur, and the animal die of pneumonia caused by a secondary infection of pyogenic bacteria.

In the treatment of hemorrhagic septicemia the use of serum appears to have good effect. Homologous serum, apparently, gives the greater benefit, and its use avoids in some degree the danger of anaphylaxis. Anaphylaxis following the use of bacterins is not uncommon, and may be severe and even cause death. This shock may be due to horse serum used to fortify broth cultures or agar media.

To avoid anaphylaxis, bacterins should preferably be an actual bacterial suspension in a dilution of physiological saline solution, and free from toxic broth or other foreign protein. Bacterins may not produce a sufficiently solid immunity to protect animals exposed to constant virulent infections, as in dealer's herds.

[20] Barber, C. W. 1937. A study of fowl paralysis. *Cornell Vet.* 27:42-51.

[22] Castagnoli, B. 1937. Comparison of sero-agglutination and intradermal tests in the diagnosis of pullorum disease. (Transl. title.) *Profilassi* 10:1-8.

[24] Fenstermacher, R. 1937. Further studies of diseases affecting moose. II. *Cornell Vet.* 27:25-37.

[25] Gibbons, W. J., and Fincher, M. G. 1937. Hemorrhagic septicemia. *Cornell Vet.* 27:52-62.

Book Reviews

The Book of Wild Pets. By Clifford B. Moore, M. A., Biologist in Charge Trailside Museum, Springfield, Massachusetts. Cloth bound; 553 pages; 300 illustrations. Published by G. P. Putnam's Sons, New York, 1937. Price $5.00.

At one time or another, most of us have owned some wild animal pet. A baby rabbit, a young frog, guinea pig, bear cub, or perhaps a bird with a broken wing, captured after a snowstorm or accident, are examples which come within our common range of experiences. In a good many cases we have lost these animals through our lack of knowledge concerning their proper care.

For many years Clifford B. Moore has been biologist in charge of the Trailside Museum, Springfield, Massachusetts. He has answered thousands of questions and letters on wildlife, and he knows the problems which perplex the amateur. Because of increasing interest in these problems, or perhaps in self defense, Mr. Moore set about writing a book, just published, in which he sets forth the proper care and feeding of wild animals. He calls it simply "The Book of Wild Pets." A 553-page volume, it is said to be the only authoritative work of its kind. In discussing characteristics, habits, housing and general care the author is doubtless writing out of a wide experience, at least to the uninitiated it seems so but in discussing treatment of ailing animals he explores the realms of pure imagination with results both preposterous and ludicrous. The directions for reducing fractures and the illustrations of splints applied to broken legs would we think win in any contest for the most impractical, impossible and ridiculous contrivance for this purpose.

"The Book of Wild Pets" makes interesting reading for the layman, and an invaluable reference for teachers, parents, scoutmasters, and boys and girls. Written in non-technical, clear style, it outlines all the information the author believed necessary for the common-sense treatment of wild animal life in captivity, in illness and health. Only essential information is included, however, without benefit of sentimental outpourings. The material runs the gamut from the rarer types of fish and reptiles to more common pets, such as the deer and various species of domestic birds.

Mr. Moore has divided his book into five parts, containing in all 23 chapters. They are: Part I, The Aquarium—The Balanced Fresh-Water Aquarium, Inhabitants for the Balanced Aquarium, Miscellaneous Inhabitants for Non-Balanced Aquaria, Water Insects for Aquaria, Garden Pools and Water Cages, The Marine Aquarium, More about Fish Foods, Fish Diseases and Their Treatment; Part II, Terraria and Their Small Animal Inhabitants—What a Terrarium Is, The Woodland Terrarium and Its Inhabitants, The Semi-Aquatic Terrarium and Its Inhabitants, The Desert Terrarium and Its Inhabitants; Part III, Insects and Spiders as Pets—Miscellaneous Insects, Spiders; Part IV, Mammals—Stocking the Home Zoo, The Health and Conditioning of Animal Life, Approaching and Feeding Wild Animals, Native Wild Animals as Pets; Part V, Birds—Food, Feeding and Drinking Appliances to Attract Birds, Bird Houses, Nesting Shelves, Roosting and Winter Shelters, Native Land Birds in Captivity, Aquatic Game Birds, Waders, and Other Water Birds, Upland Game Birds in Captivity.

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Proceedings of the Kansas Veterinary Medical Association—1937. Compiled by Chas. W. Bowers, secretary of the Association, this volume includes the names of the 1936-37, and 1937-38 officers, elective members of the executive board, board of directors, active members of the association, committees, and also the constitution, by-laws and code of ethics of the Association.

Papers read before the assembly and the discussion of these are quoted in their entirety, the following being the topics discussed: Some Thoughts on Nutrition, by Kent R. Dudley, Iola; Parasites of Horses, by T. P. Crispwell, The Sheep Industry and Its Veterinary Problems, by W. R. Barnard, Belleville; Gastro Intestinal Disturbances in Dogs, by R. L. Anderes, Kansas City, and Anesthetics Used in Small Animal Practice, by E. P. Leonard.